Vision Appliances

GEVA

GigE Vision Appliance

User's Reference Manual

405-00024-00

Rev. 02
9 November 2010

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Document Number 405-00024-00

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Certifications

FCC Compliance Statement

This product has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and may cause harmful interference to radio communication.

European Declaration of Conformity

This product has been tested to comply with the EC Directive for a class B digital device. It has been tested and found to comply with EN55022/CISPR22.

CFR 21 Part 11

This product provides the tools needed for users to implement an auditing program that could be in compliance with CFR21 Part 11.

- System and software backup and restore – Acronis® True Image software
- System software security (password logging and access limits) – Sherlock and iNspect software
- Protection of system backup files from modification – Acronis True Image software
- Record of actions by users with time stamp information – iNspect software
- Time stamp information on data output – Sherlock and iNspect software

Handling and Operating Precautions

Care should always be exercised when handling and operating your system. Even though the system is encased within a rugged, industrial enclosure, incorrect use or handling can result in damage to your investment. To prevent this, we recommend you ***avoid the following***:

- "Hot-plugging" cables and devices. Be sure to shut the system down and remove power before connecting or disconnecting anything to it.
- "Free-standing" operation. Whenever possible, we advise mounting the system to prevent it from falling accidentally. Mounting holes are provided at the base of the unit. DIN mounting hardware is optionally available.
- Pulling power while operating. Whenever possible, gracefully shutdown the system if at any time you need to remove power.
- Operating the system in a hazardous environment. The system is not NEMA rated.
- Image logging to the C: partition. A minor bug in the NTFS file system may cause corruption of the Windows boot sector under continuous image logging to the C: partition. Use the D: partition for image logging.

ElectroStatic Discharge

Avoid the damage that ESD can cause. Never expose the internal electronics to a potentially hazardous environment by opening the enclosure. Doing so may cause serious damage.

User Service Warning

This product has no field-replaceable components. Tampering with the unit will void the product warranty.

Warranty

DALSA warrants the GEVA against defects in materials and workmanship for a period of one year from the date of delivery. DALSA and its representatives expressly disclaim any and all other warranties.

Your sole remedy shall be repair or replacement of the GEVA product and associated optional components, provided that the defective product is returned within the warranty period.

If you need to return the system, you must contact the DALSA representative who sold you the system. Do not return your product to DALSA IPD without authorization.

DALSA assumes no liability for damages resulting from the use of this manual.

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1. INTRODUCTION

Overview

The GEVA is an integrated platform that includes processing, display, image capture, networking, communication and industrial I/O. These standard hardware components, encased within an aluminum chassis, provide the basis for a powerful industrial vision system.

The GEVA system offers increased bandwidth, more than twice that of DALSA's previous generation GigE system. Each GigE port has a dedicated PCI-Express "lane" with up to 250MB/s theoretical limit. This offers significant improvement in applications requiring high resolution or multiple cameras.

About This Manual

This manual will assist you with the installation and setup of your Vision Appliance product and the inspection software. It describes what the product supports and how to connect the external interfaces.

If your Vision Appliance questions are not answered in this reference, please contact your local DALSA representative who will be happy to answer or direct your question to the appropriate factory resource.

The vertical bars are "change bars" and mark additions or changes from the previous version of this manual.

2. BEFORE YOU BEGIN

Product Verification

Before getting started, please take a few minutes to verify that your shipment is complete and in good condition. If your product has been visibly damaged during shipment or is missing parts, please contact your local DALSA representative immediately.

The basic system contains the following elements:

- GEVA chassis
- 7 Molex connectors of various sizes to fit the rear panel connectors on the chassis

The following options are available:

- Camera Power and I/O cable(s)
- Genie Cameras
- RJ45 Data cables
- DIN mounting rail
- 24 Volt DC power supply

Environmental Requirements

For reliable operation, this product should be operated within the following environmental conditions:

- Stable ambient temperature from 10°C to 45°C
- Relative humidity to 90% non-condensing
- Stable ambient lighting
- No excessive vibration or mechanical shock
- No contact with corrosive agents
- No liquid splash
- Dust and dirt controlled (regular maintenance checks)

CAUTION: *The enclosure includes air intake holes at the top and one side of the unit and a small exhaust fan on the other side. For the continued reliability of the system, it is important that these areas are not obstructed when the unit is mounted.*

3. SUPPORT AND MAINTENANCE

Support

DALSA IPD provides the following support resources:

Documentation

In addition to this manual, the following information ships with the product:

Online help – fingertip help is available on every screen ("panel") of the Sherlock and iNspect software.

PDF document – a copy of this manual is located on the hard drive, in directory "PDF Manuals".

Genie Camera manuals available from the Start menu, Start–>Programs–>DALSA–>Genie.

IPD Website

Our www.dalsa.com/ipd website is updated regularly with the latest information.

Factory Support

Call, fax, or email your local representative, or the DALSA IPD Headquarters, for product support.

DALSA IPD
700 Technology Park Drive
Billerica, MA 01821

Main Number: +1.978.670.2002
FAX: +1.978.670.2010
Email: support.ipd@dalsa.com
Internet: http://www.dalsa.com/ipd

To assist our staff in supporting you better, please have the following information available:

1. Name of DALSA IPD representative who sold you the product.
2. Serial number of the unit.
3. Description of how the product is being used (application and environment).
4. Description of the problem and what you were doing when the problem occurred.
5. Exact wording of any error or warning messages that the product displayed.
6. What you have done to try and solve it.

Maintenance

For continued product health and reliable results, DALSA recommends regular maintenance checks to keep the equipment free of dust and dirt. Use anti-static compressed air to blow dust off the Lens and use a lens cloth or cleaner to wipe away grease, oil, or fingerprints.

4. PRODUCT OVERVIEW

Product Description

The GEVA is an optical inspection appliance designed for high-speed applications requiring single or multiple views of a part. Both easy to learn and deploy, the GEVA is an ideal choice for manufacturers who need to ensure the best possible quality in their product.

The GEVA is a stand-alone product that does not require interfacing to a PC for setup. Remote connections are available for control and monitoring. All required software, user interfaces and communication controls are resident in the product.

Pre-inspection setup requires adjusting the sensor trigger-to-image delay, focusing the camera lens and adjusting the light source to optimize image picture quality (highlight features of interest). This is an important step to assure accurate and repeatable results.

Inspections are quickly set up by applying instances of tools to an image template captured by each of the cameras. Once configured with acceptable tolerances, the device is ready to start inspecting. In inspect mode, results and images are posted to the local display continuously. At the same time, outputs control downstream part handling and results are communicated to related equipment via RS-232 or Ethernet.

The GEVA accommodates both translation (X,Y) and 360° rotation of parts. While fixturing is recommended wherever possible, it is not a requirement for operation of this product.

Typical Applications

The GEVA can be applied to solve a diverse range of manufacturing problems across a multitude of industries. Typical applications include:

- Detect missing or incorrect components in a package or assembly
- Inspect front, back and top surfaces simultaneously
- Track or verify products – barcode or 2D matrix
- Align PCBs – locate and report position of multiple fiducials
- Locate and count objects
- Verify label position, fill level, cap and safety seal on bottles
- Check for surface defects
- Verify a label is not torn, smeared, stained or folded

Components

Figure 1 illustrates the physical components associated with a typical GEVA installation. Information on connector pinouts can be found in this Chapter, or in Appendix A starting on page 40. Information on electrical characteristics can be found starting on page 28.

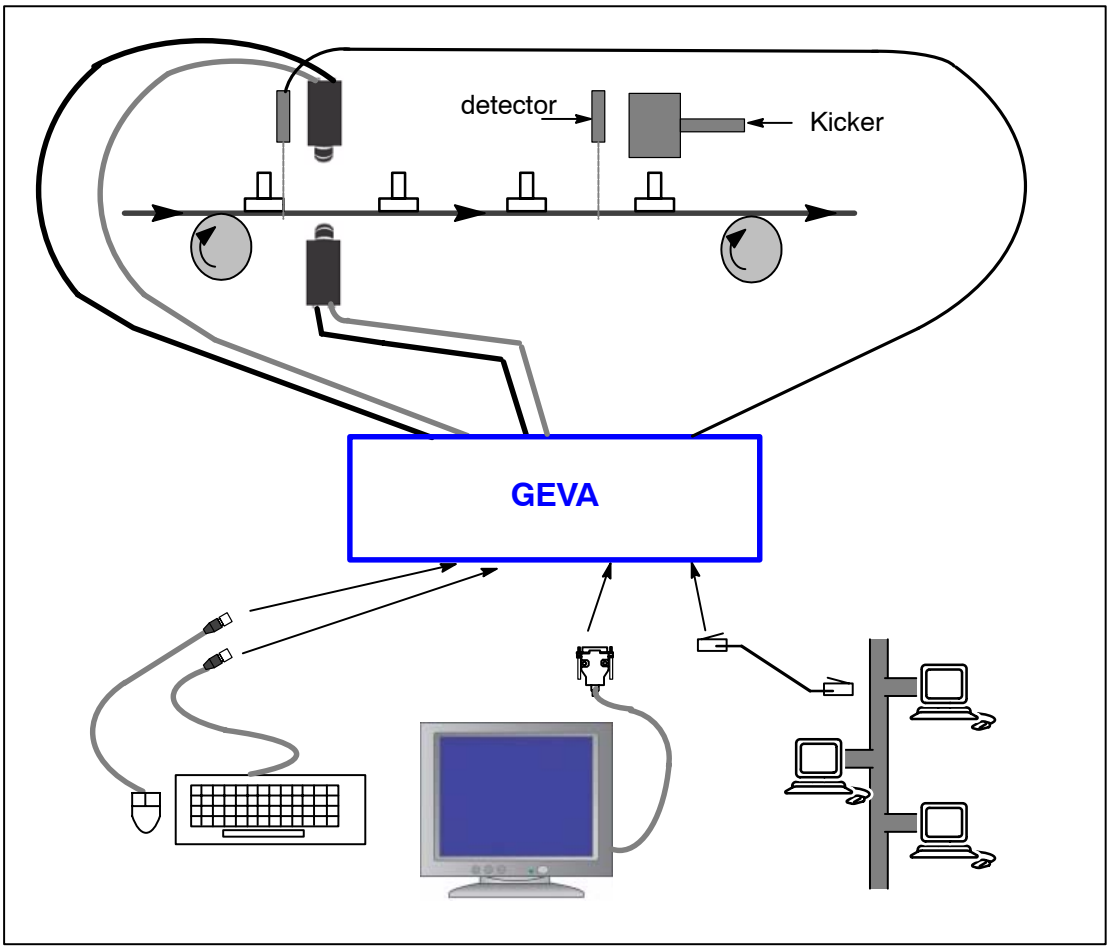

Figure 1. GEVA Installation

NOTE: *Not all of the physical interfaces are used by the GEVA software. They are, however, available to the user for interfacing with third party products, if required.*

CAUTION: *The enclosure includes air intake holes at the top and sides of the unit and a small exhaust fan on one side. For the continued reliability of the system, it is important that these areas are not obstructed when the unit is mounted.*

5. INSTALLATION

Pre-Installation Checks

1. Read the handling and operating precautions in Section 2.
2. Check that all essential components are present:
   a. The GEVA unit
   b. Display, keyboard and mouse
   c. Camera(s) and associated cable(s)
   d. C-Mount Lens for each camera
   e. 24VDC power supply with 60 W minimum output
   f. Light Source, cable and power supply if necessary
   g. Sensor trigger and cable (if required)
   h. I/O breakout hardware

Interface Specifications

Before attempting installation, familiarize yourself with the various hardware interfaces detailed in Figure 2.

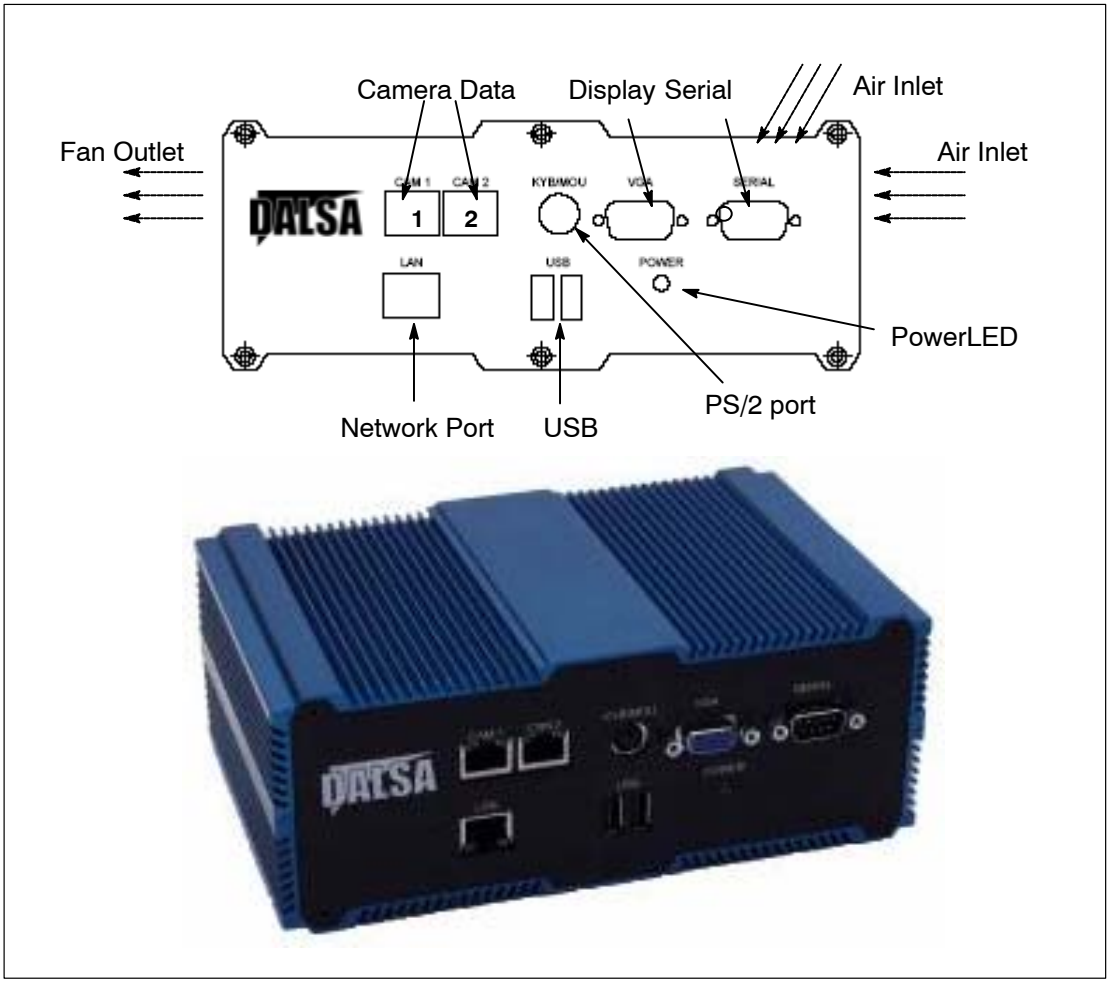

Figure 2. GEVA Front Panel Connectors

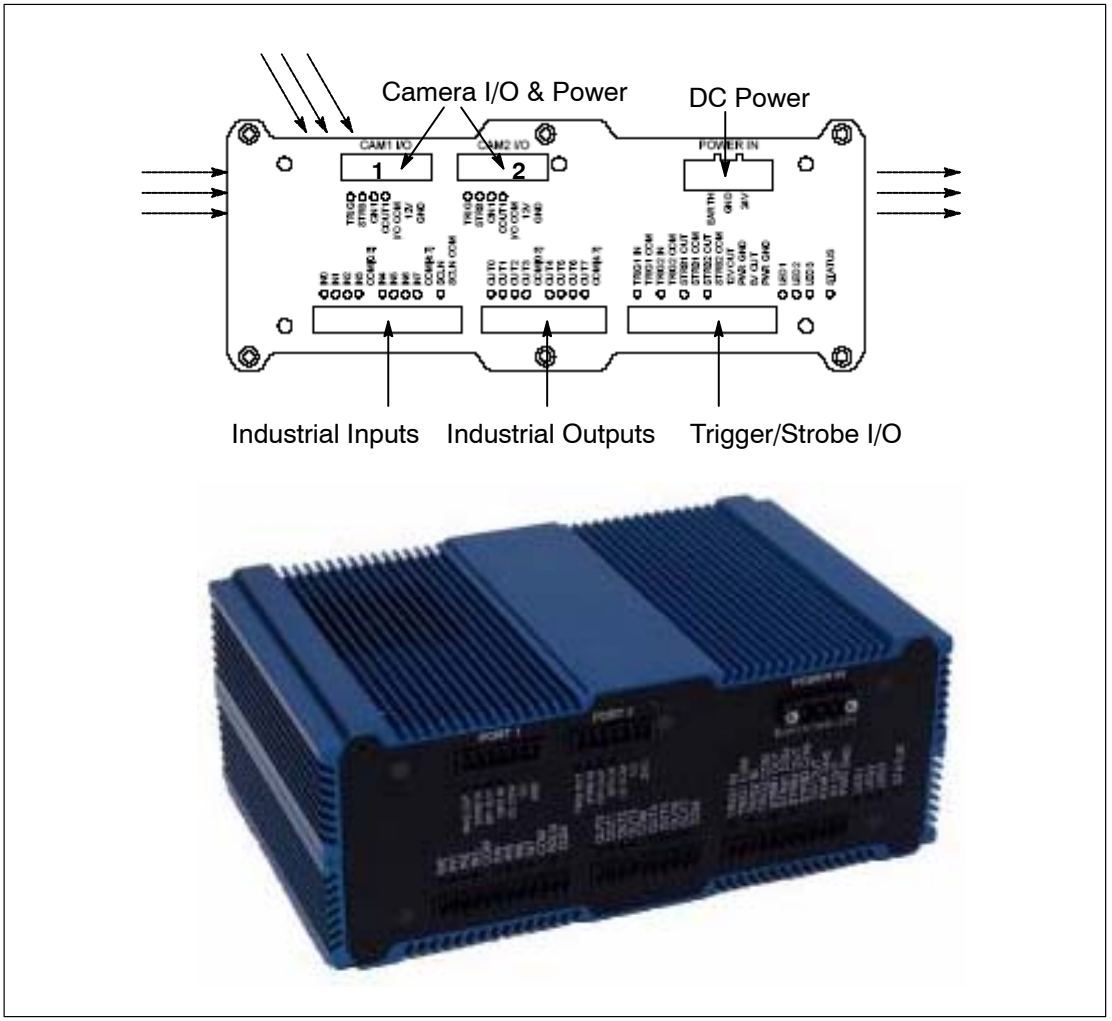

Figure 3. GEVA Rear Panel Connectors

Camera Connections

The Genie cameras offer a range of resolutions from 640x480 pixels up to 1600x1200. DALSA offers cameras for use with our vision systems, some of which are referenced below. The Genie camera manuals are installed on the hard drive with the Genie drivers, and are available from the Windows Start menu.

The camera interface supports:

- Progressive scan digital GigE (Gigabit Ethernet) cameras with standard or double-speed capabilities. Sherlock and iNspect support asynchronous camera acquisition.
- The RJ45 connectors can be connected to multiple cameras using external GigE switches.

Recommended Camera List

The following cameras are offered by DALSA. Consult DALSA for alternate choices if required.

Model	*Type*	*Resolution*	*Full frame speed*
Genie M640	monochrome	640x480	64 fps
Genie M1024	monochrome	1024x768	20 fps
Genie M1400	monochrome	1360x1024	15 fps
Genie M1600	monochrome	1600x1200	12 fps
Genie C640	color	640x480	64 fps
Genie C1024	color	1024x768	20 fps
Genie C1400	color	1360x1024	15 fps
Genie C1600	color	1600x1200	12 fps

- Sherlock has no limit on the number of cameras supported.
- iNspect "Standard" license supports up to 4 cameras. iNspect "Extended" license supports up to 8 cameras.
- The hardware design does not limit how multiple cameras are connected. To improve data throughput, it is recommended multiple cameras be connected using both connectors, but the design does not require it.

Camera Settings

NOTE *Cameras are configured with different IP Addresses that match the two different GigE Port addresses on the GEVA. The cameras cannot be swapped between the two camera ports.*

In the factory default setting, GEVA Camera Port 1 is set to IP Address 10.1.64.5, and GEVA Camera Port 2 is set to IP Address 10.1.128.7. Subnet Mask 255.255.192.0. The VA-Genie Cam-

era Setup program assigns compatible addresses to the two cameras. Once addresses are assigned, the cameras cannot be swapped between the two camera ports.

Genie cameras purchased through a different distribution channel are usually set to dynamic addressing by default. This is usable in a distributed network situation, but not when cameras are directly connected to the GEVA camera ports. The GEVA is not a DHCP server. Connect the cameras and run the VA-Genie Camera Setup program, to assign fixed addresses to the cameras, then label each camera for the port it was connected to. The cameras are no longer interchangeable between the two camera ports. You should run the Firmware update utility to verify your camera's firmware is up to date, or if updating is required. Start –> Programs –> DALSA –> Genie –> Firmware Update.

The camera parameters are programmable through the GigE interface. DALSA IPD provides the Sapera CamExpert utility, Sherlock camera I/O instructions, and iNspect Sensor Setup panel for programming camera settings.

Sherlock uses a separate configuration file, usually found in the \VAGenie\Config directory. iNspect saves the camera settings in the Solution file.

Camera Exposure Control

The Genie camera has programmable Exposure Time. For digital cameras, programming the exposure time yields better control and results than pulse width controlled exposure commonly used to control the exposure in analog cameras. The Genie camera does have a pulse width controlled mode for situations where analog cameras are being replaced. When designing a system with digital cameras (GigE or CameraLink) you should use the programmable exposure time.

You can save an exposure time value to the camera, using CamExpert. You can also change the exposure time in iNspect and Sherlock.

GigE Camera Video Data Cable

The GigE cameras are compatible with standard RJ45 ethernet connectors and cables. The Genie cameras automatically sense or detect the transmit and send signals. This means you can use either a regular network cable or a crossover cable. DALSA offers a crossover cable with a locking connector that attaches to the camera. This cable is also compatible with the standard RJ45 or Ethernet connectors.

Part Number	*Cable Length*
A-CAB-GE-00	3 meters
A-CAB-GE-01	5 meters
A-CAB-GE-02	10 meters

Camera Control & Power Cable

The GEVA provides two 7-pin Molex connectors for Camera I/O signals to control trigger and receive strobe. 12 Volt power is also available on this connector. There is a 500 mA fusable link in the 12 Volt supply at each camera connector.

- The camera(s) can be triggered through the GEVA I/O. The external trigger(s) would be input at the 12-pin Trigger/Strobe connector, and output to the cameras through the 7-pin connectors illustrated in Figure 2 on page 17.
- The camera(s) may have a Strobe output, that can be connected to the GEVA through the 7-pin connectors and output to external lighting control equipment through the 12-pin Trigger/Strobe connector.

NOTE *iNspect and Sherlock assume Genie camera Input2 is the trigger input, and Genie camera Output2 is the strobe output (when connected to the GEVA's Camera I/O ports). If you use CamExpert to create a camera configuration file, make sure you use Input2 for trigger, and Output2 for strobe.*

The optional camera Control and Power cable can be ordered. Refer to the color coding in the table that follows.

Figure 4. Control and Power Cable

Part Number	*Cable Length*
A-CAB-GEVA-F0	3 meters
A-CAB-GEVA-F1	5 meters
A-CAB-GEVA-F2	10 meters
A-CAB-GEVA-F3	15 meters

Camera Port Pinout

7-pin Molex	*GEVA Label*	*Color*		*Camera Function*	*Direction*	*12-Pin Hirose*
1	TRIG	White		Trigger on IN2+	Camera In, GEVA Out	11
2	STRB	Orange		Strobe on OUT2+	Camera Out, GEVA In	7
3	CIN1	Green		IN1 +	Camera In, GEVA Out	6
4	COUT1	Blue		OUT1 +	Camera Out, GEVA In	4
5	I/O COM	Brown		– for all I/O		3, 5, 8, 12
6	12V	Red		+12 Volt Power	Camera Power input	2
7	GND	Black		Power Ground		1

Cameras pins 3, 5, 8, 12 are connected together through the connector shell and grounded by the brown wire to I/O COM on the Molex connector.

GEVA supplies 12 Volts at 500 mA maximum to each camera connector through a fusable link.

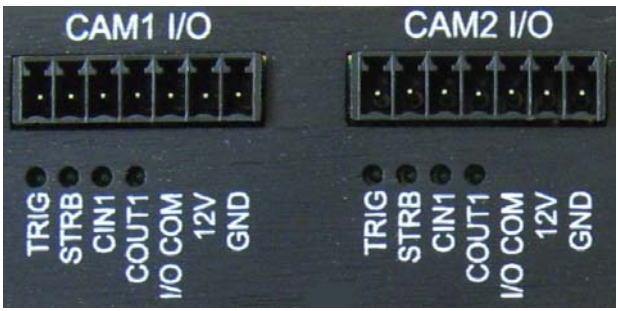

Figure 5. Camera I/O Port Connectors

Alternative Camera Control Options

Another possible configuration would be:

- The camera is triggered directly from the part sensor, bypassing the GEVA.
- The camera's strobe output is connected directly to the lighting equipment, bypassing the GEVA.

For this case, DALSA offers an optional DCI-100 DALSA Camera Interface module for connecting the camera signals to terminal block connectors. A Control and Power cable with 15-pin DSUB is used to connect the Cameras to the DCI-100. The Camera Power and I/O connectors on the GEVA would not be used for the strobe and trigger signals when the DCI-100 is in use. Only the GigE data ports would be used.

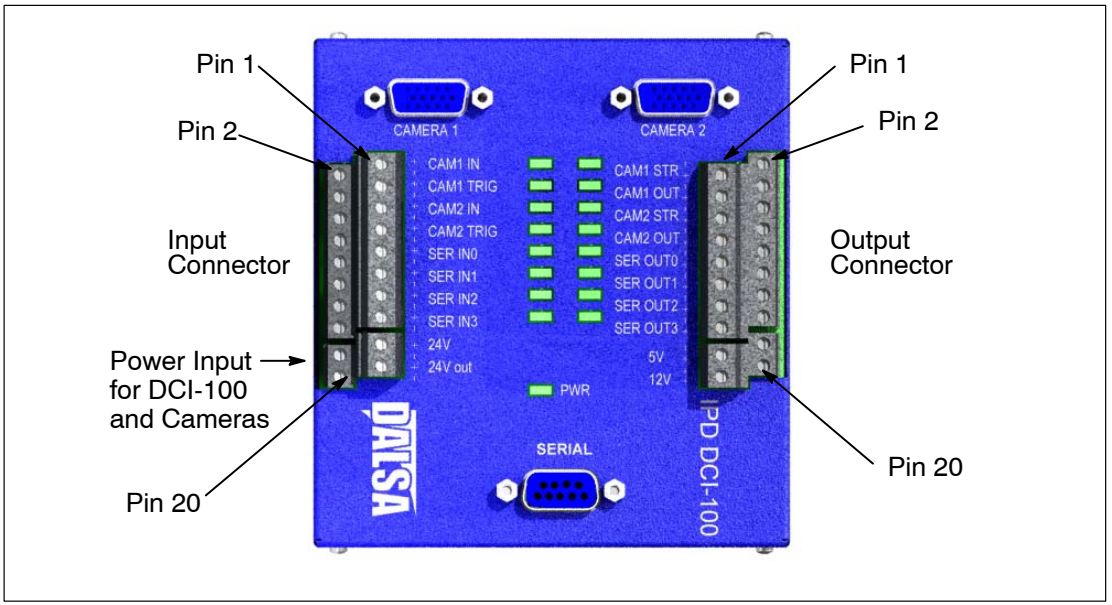

Figure 6. DCI-100 Connectors

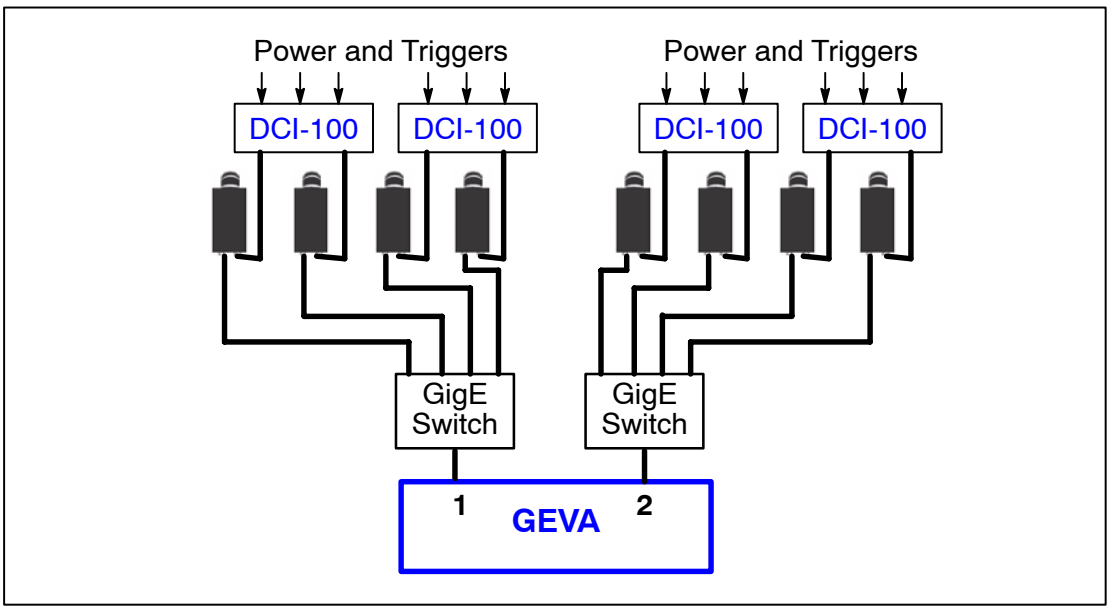

Figure 7. Multiple Cameras and GigE Switches

Two cameras could be connected directly to the Camera data ports on the GEVA front panel. More than 2 cameras could be connected using GigE Data Switches connected to the GEVA.

It is recommended you use both camera ports, but it is not a restriction of the hardware design. Using the two ports allows higher data throughput.

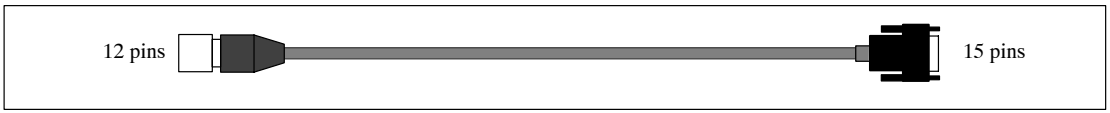

Figure 8. Control and Power Cable

Part Number	*Cable Length*
A-CAB-GTP-00	3 meters
A-CAB-GTP-01	5 meters
A-CAB-GTP-02	10 meters

Network Connection

If your system is to be connected to a LAN (Local Area Network), connect a network cable to the RJ45 Ethernet jack labeled LAN, located below the two Camera Port connectors. The GEVA supports GigE (1,000BaseT) Fast Ethernet (100BaseT) and Twisted Pair Ethernet (10BaseT). If you plan to use Fast Ethernet or GigE, use a Category 5 (UTP5) cable. This network port is configured for Dynamic Addressing or DHCP.

NOTE *Do not enable "Jumbo Frames" on this port if your network does not support it. Enabling "Jumbo Frames" when not supported may cause difficulty accessing the network.*

The two GEVA Camera Ports are configured for Static Addresses: Cam1 port address 10.1.64.5 and Cam2 port address 10.1.128.7 and both ports use Subnet Mask 255.255.192.0. "Jumbo Frames" is set to 9014 and "Receive Descriptor" set to 2048. A larger value for Jumbo Frames seems to degrade operation in some cases.

The Jumbo Frames setting may need to be reduced for a single large format color camera. The individual Cameras settings for packet size and interpacket delay may need adjusting in some multiple camera configurations.

The hardware does not prohibit using the Lan Port connector for a camera data port.

Serial Port Connection

The GEVA has one RS-232/485 compliant serial port. The serial port is typically used for passing results to a third party device, such as a PLC or other peripherals. The serial port may be used to communicate with the optional DCI-100 DALSA Camera Interface module.

Industrial I/O Connections

The GEVA has three connectors for industrial I/O connections: Inputs, Outputs, and Trigger/ Strobe Connectors.

Digital Inputs

Input Connector Definitions

Pin #	*Label*	*Definition*
1	IN0	Input 0
2	IN1	Input 1
3	IN2	Input 2
4	IN3	Input 3
5	COM[0:3]	Common for Inputs 0–3
6	IN4	Input 4
7	IN5	Input 5
8	IN6	Input 6
9	IN7	Input 7
10	COM[4:7]	Common for Inputs 4–7
11	SOLN	Switch Solution input for iNspect
12	COM	Common for the Switch Solution input

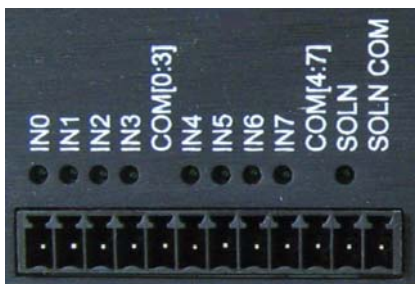

Figure 9. GEVA Input Connector

Digital Outputs

Output Connector Definitions

Pin #	*Label*	*Definition*
1	OUT0	Output 0
2	OUT1	Output 1
3	OUT2	Output 2
4	OUT3	Output 3
5	COM[0:3]	Common for Outputs 0–3
6	OUT4	Output 4
7	OUT5	Output 5
8	OUT6	Output 6
9	OUT7	Output 7
10	COM[4:7]	Common for Outputs 4–7

Output current limited by a fusable link on each output. 500 mA @ 20°C, 290 mA @ 85°C.

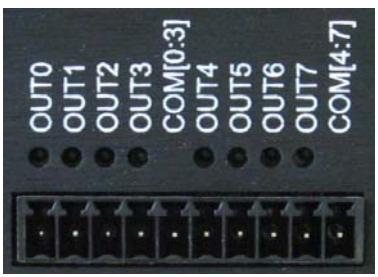

Figure 10. GEVA Output Connector

Triggers and Strobes

Trigger/Strobe Connector Definitions

Pin #	*Label*	*Definition*	*Direction*
1	TRIG1 IN	Trigger 1 input for Camera 1	GEVA Input
2	TRIG1 COM	Common for Trigger 1	
3	TRIG2 IN	Trigger 2 input for Camera 2	GEVA Input
4	TRIG2 COM	Common for Trigger 2	
5	STRB1 OUT	Strobe 1 output from Camera 1	GEVA Output
6	STRB1 COM	Common for Strobe 1	
7	STRB2 OUT	Strobe 2 input for Camera 2	GEVA Output
8	STRB2 COM	Common for Strobe 2	
9	12V OUT	12 Volt DC output (500 mA @ 20C)	
10	PWR GND	Ground for 12 Volts & 5 Volts	
11	5V OUT	5 Volt DC output (500 mA @20C)	
12	PWR GND	Ground for 12 Volts & 5 Volts	

Pins 10 and 12 are internally connected.

Strobe output current limited by a fusable link on each output. 125 mA @ 20°C, 50 mA @ 85°C.

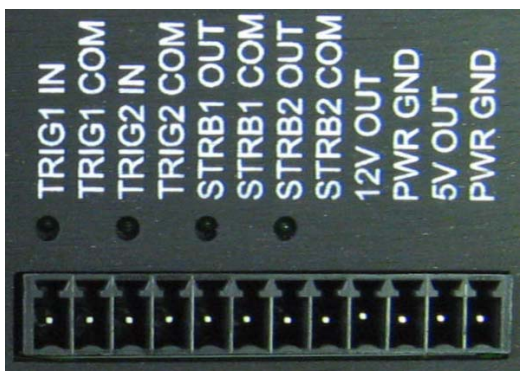

Figure 11. Trigger/Strobe/Power Connector

Input Electrical Specifications

GEVA inputs IN(7–0) are opto-isolated, TRIG1and TRIG2 are solid state. All inputs are polarity insensitive and can be connected to either sourcing (PNP) or sinking (NPN) outputs. They require no external pull-up or pull-down resistors and can accept input voltage levels up to 30 Volts. All inputs support programmable threshold level and debounce period.

NOTE *The default threshold voltage is 12 Volts (for a 24 Volt environment). You can override this value in iNspect and Sherlock. Changes persist after the iNspect or Sherlock program is closed. The default 12 Volts returns when the GEVA is powered up.*

NOTE *The trigger voltage level is NOT passed through to the Genie camera.*

- The iNspect thresholds are controlled in the Setup Inputs panel, and saved in the Solution file. The GEVA does not use the GIOtest.txt file (only the VA61 uses that file).
- The Sherlock thresholds can be controlled by values in the configuration file. The path to this file is stored in the "IfcDrv.ini" file found in the Sherlock\Drivers directory. Usually this file is at D:\VAGenie\Config. The user can save it at any location and alter the path in IfcDrv.ini.

Signal state	*Min.*	*Max*
Input voltage range	0 V	30 V
Programmable threshold	0 V *	18 V
Input protection resistance		1180 ohms
Typical current at 24 V		19 mA
Isolation		3750 RMS

* a higher threshold results in more noise immunity or noise rejection.

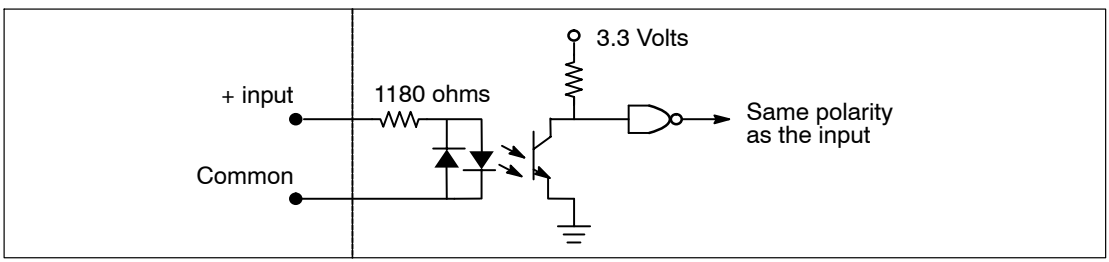

Figure 12. Opto-isolated Inputs

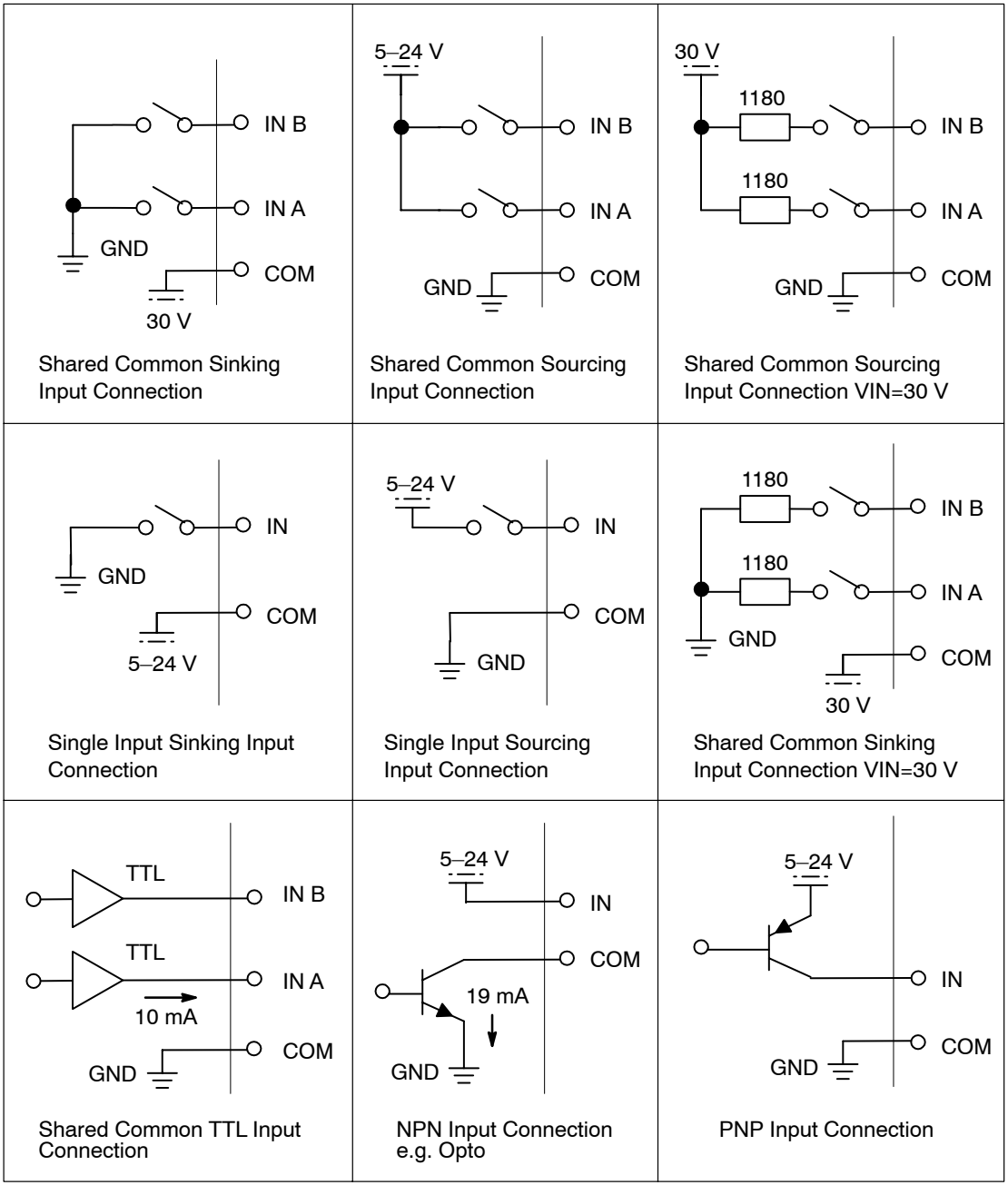

Figure 13. Input Configurations

Output Electrical Specifications

GEVA outputs OUT(7–0) STRB1 and STRB2 are solid-state relays that can operate up to 30 Volts. They do not require external pull-up or pull-down resistors. They are polarity insensitive and exhibit no contact bounce. The outputs can drive with the following specification:

Parameter	*Max*
Output Voltage	30 V
Output Sink Current	125mA@20°C 50mA@85°C
On Resistance	12 Ohm

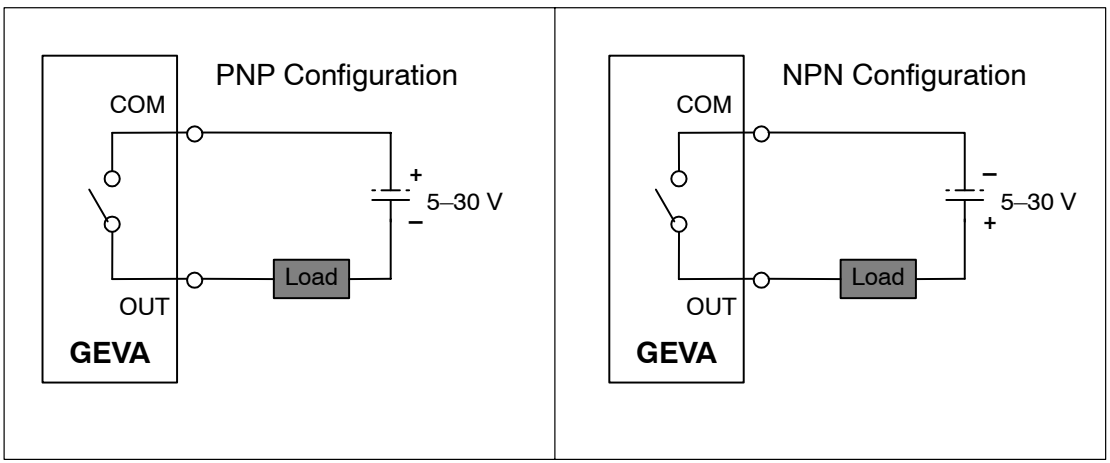

Figure 14. Typical Output Wiring Diagram

Mounting Options

GEVA Chassis

The GEVA provides the means to mount to a standard DIN rail or custom assembly. The mounting holes are located on the base plate of the unit.

- Cabinet dimensions:
  W 20.3 cm x L 12.7 cm x H 7.9 cm; W 8 inches x L 5 inches x H 3.125 inches.
- Weight: 2.62 kg; 5.75 lb.

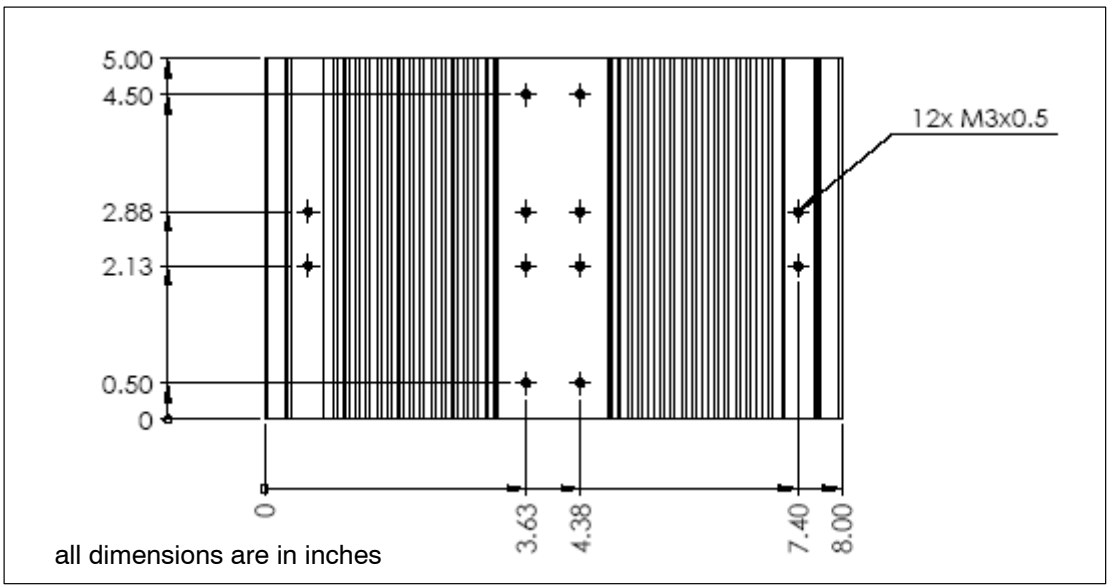

Figure 15. GEVA Mounting Holes

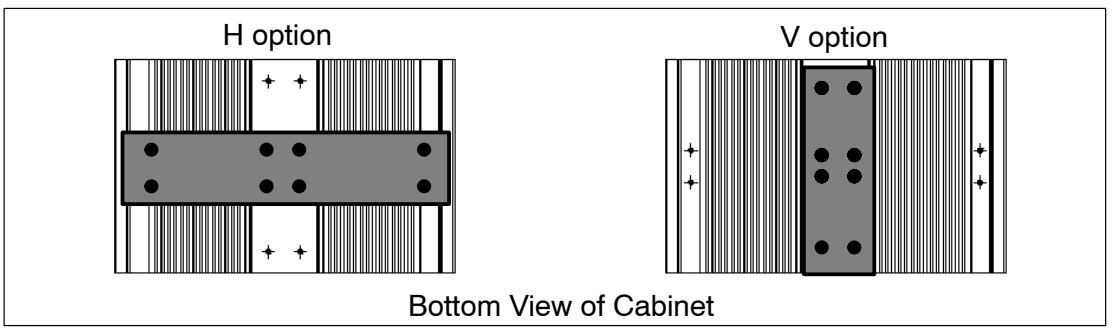

Figure 16. GEVA DIN Rail Mounting Options

- Two DIN rail mounts are available, for 2 different orientations of the GEVA cabinet:
  –H option 20.3 cm and –V option 12.7 cm.

Rear Panel Connector Options

The Molex connectors are available in two orientations or options. These determine how the wiring exits from the Molex connectors

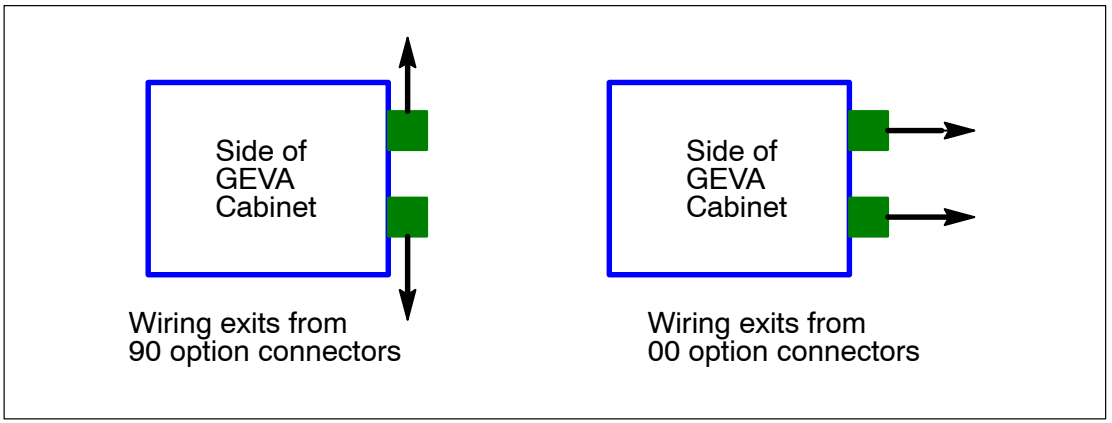

Figure 17. Molex Connector Orientations

Cameras

The DALSA Genie cameras provide mounting holes on the bottom of the camera. The location and size of the mounting holes are shown in Figure 18. Tripod mounting plates are also available.

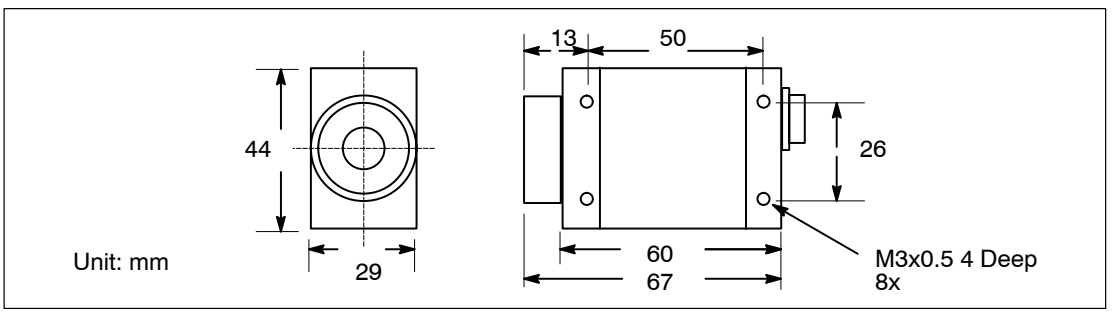

Figure 18. Genie Camera Mounting Holes

Installation

1. Mount the Camera(s) and GEVA in a location free from excessive shock, moisture, and vibration. The GEVA can be used with a standard DIN rail mount. Mounting holes are located on the base plate.
2. Connect a standard VGA Monitor to the Display connector.
3. Connect a mouse and keyboard, using either the PS/2 or USB connectors. Note: A PS2 mouse cannot be connected directly to the PS/2 connector, but does work correctly through a PS/2 Y adapter cable.
4. Thread the lens onto each camera lens mount.
5. Attach camera cables to each camera and connect them to the camera ports on the GEVA. See "Interface Specifications" and Figure 2, on page 17. ***If you ordered 2 cameras with the GEVA, make sure you match the camera and port correctly. The IP Addresses are configured for one port or the other and are not interchangeable.***
6. Connect the sensor trigger inputs to the I/O Connector.
7. Mount the light source. Connect the strobe controller (if required) to the strobe output of the I/O Connector.
8. Wire the required outputs from the I/O to the PLC or pass/reject mechanisms.
9. Connect network as required.
10. Connect Serial connections as required.

Before powering on the unit, take a couple of minutes to verify your hardware installation:

11. Verify all cable connections
12. Verify all electrical connections
13. Verify all components are securely mounted.

Complete the installation by applying power to the unit. The GEVA is powered from an external supply (option A-PWR-NSII) that connects to the 3-pin D-Sub connector. The power requirements are:

- +24 Volts +/–10% at 60Watts maximum

When the GEVA has booted, the Genie cameras take a minute to acquire their network connection to the GEVA. There is a camera icon in the system tray (near the time). Message balloons may appear saying devices are connected or disconnected. Hover the cursor over this camera icon to see status on the number of cameras successfully configured and available. Run the VA-Genie camera setup utility to verify the cameras are connected correctly.

The hardware installation is now complete, and you can proceed to setting up the inspection. Refer to the separate User's Reference Manuals for iNspect or Sherlock.

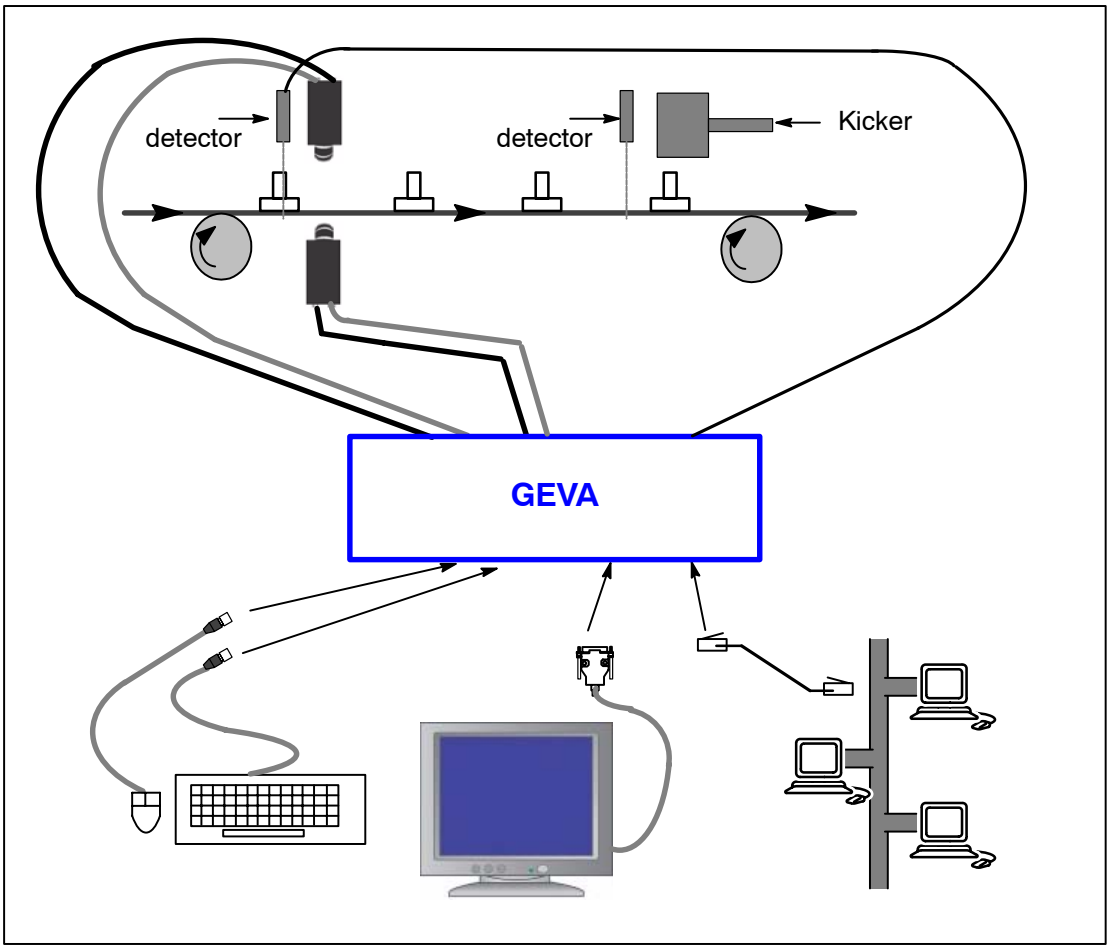

Figure 19. GEVA Installation

NOTE: *Not all of the physical interfaces are used by the GEVA software. They are, however, available to the user for interfacing with third party products, if required.*

CAUTION: *The enclosure includes air intake holes at the top and one side of the unit and a small exhaust fan on one side. For the continued reliability of the system, it is important that these areas are not obstructed when the unit is mounted.*

Camera Configuration

iNspect

The "IPD Camera and Language Selector" allows you to change the camera type (Analog, Firewire, GigE, and Virtual or image sequence) for the iNspect application (not for Sherlock). If a saved Solution is not compatible with the selected camera, it will not load or run.

The iNspect application uses a generic Genie camera file "GEVtest.txt" in the D:\iNspect directory. The GEVA does not use the file GIOtest.txt. You can change settings in the iNspect application. The settings and image size are saved in the Solution file. Camera settings are sent to the camera when a saved Solution is loaded. The Solution will not load if the camera type and image size does not match.

Sherlock

The "Sapera Acquisition Wizard" identifies all available Genie Cameras, and creates a file "SaperaLTDrv.ini" that identifies them in Sherlock, and (optionally) points to Camera Configuration files. Several example camera files are included on the GEVA. The Sherlock application uses the settings stored in the camera, or in camera configuration files. You can change settings for Trigger, Strobe, Exposure, White Balance, Gain, Black Level, using the CamExpert utility. You can use the Sherlock program instructions to change Gain, Exposure (shutter time) or Strobe pulse width (IO:Camera:SetNumberFeature).

The "VA-Genie Camera Setup" utility configures the GEVA I/O Connector, connecting the Genie Camera strobe and trigger from the 7-pin Camera Port connectors to the 12-pin Trigger/Strobe Connector. The driver default (no configuration file) is separate triggers for each camera, and strobe outputs disabled. There are example "GIO" configuration files included on the GEVA, in the VAGenie\Config directory. The file in use is selected by the IFCDrv.ini file. The file selected by the factory installation is usually "2Trig2Strobe.txt" which enables separate triggers for each camera and both strobe outputs enabled. The GIO configuration can also be used to change the trigger and strobe signal polarity, and the thresholds on the triggers and digital I/O inputs.

Troubleshooting

1. You have launched **Sherlock**, but the Sherlock application fails to open.

This problem is usually caused by either a mismatch in the available hardware and the configuration files, or an incompatibility in the configuration file and the camera.

a. Verify all cameras are available, by hovering over the camera icon in the System tray, or Start–Programs–DALSA–Sapera Network Imaging Package–DALSA GigE Vision Device Status. If Sherlock is running the cameras should be "Connected". If Sherlock is closed, the cameras should be "Available". If the Status windows says "IP Error" the addresses are not correctly set. Refer to Appendix E. If the Status window says "GVSP Unavailable" there is a problem with the GigE port driver. Refer to the document "Solving GVSP Unavailable" on your GEVA in D:\IPD Install Files\VAGenie, or on the Sherlock CD, in the directory \VAGenie.

b. Examine the file \Sherlock\Drivers\SaperaLTDrv.ini, and determine which Camera Configuration files are in use, and how many cameras are called out.

c. Open the Sapera CamExpert utility from a desktop icon or from the Start menu: Start–Programs–DALSA–Sapera

d. Select a Camera from the "Device" drop down. Select the camera configuration file called out by the SaperaLTDrv.ini file. Notice if the message pane contains any errors. If there are error messages, the camera firmware is not compatible with some parameter(s) in the file.

e. Close CamExpert, and run the Genie Firmware Update utility. If the status says "Update Required" the camera firmware is outdated. Click "Automatic" to run the update. If the status says "Update Not Required" the configuration file is outdated. Follow the steps in Appendix E to set up your Genie camera and save a new configuration file.

2. You have launched **Sherlock**, but you do not see a camera image on the display.

a. Pull down the Options–Acquisition menu. This display will tell you if there is not license for acquisition.

b. The Options–Acquisition display will tell you what drivers are enabled and loaded. Verify *both* the SaperaLTDrv and IFCDrv drivers are enabled. If they are not both enabled, enable them now and close Sherlock. Drivers are loaded only when Sherlock first opens.

c. If there is no Image Window, it is possible the Color Camera is not configured for RGB color. Sherlock does not support Raw 8, YUY2 or UYVY settings. Refer to Appendix E on configuring the Genie camera.

d. Right-click in the Image Window, and select a camera. If there are no camera selections available, the Sapera LT driver did not load correctly.

e. Verify that the lens aperture is not closed.

f. Verify that the inspection area (meaning the area that the camera is viewing) is correctly illuminated.

g. The default trigger threshold is 12 Volts. A 5 Volt signal will not trigger the camera.

3. You have launched **iNspect** but you do not see an image on the display.

a. Verify the acquisition heartbeat (LED1) is flashing. If it is not, a connection problem is likely. Verify the cables again.

b. Verify that the lens aperture is not closed.

c. Verify that the inspection area (meaning the area that the camera is viewing) is correctly illuminated.

d. Verify that the camera and camera port match. The cameras cannot be swapped between the two ports once their IP Addresses are configured.

e. Verify that all cameras are successfully configured and available, by hovering over the camera icon in the System tray (by the time display in the lower right corner).

f. Verify the Camera Selector has "GigE camera" selected. Installing a new software version defaults to the analog cameras. Click the bubble beside GigE, then click the "Set" button at the bottom of the Camera Configurator window.

4. Your **iNspect** Solution file does not load. There are no measurements displayed.

If the camera type used in the saved solution does not match the current attached camera, the solution will not load. iNspect will start a New Solution.

a. Use the Report Generator utility to create a report of your Solution file. This will specify the cameras in use when the Solution was created.

Software

There are several software packages that make the GEVA operate with the Genie cameras and application programs. This section attempts to show how these relate and depend on each other.

VA-Genie Camera Setup

- Configures the Genie camera(s) with fixed IP Addresses compatible with the two camera ports on the GEVA. This action is performed the first time this utility is run after a new Genie camera is connected. After that, opening this utility verifies the camera addresses are compatible with the ports they are connected to. Fixed addresses are necessary for ***iNspect***.

- GEVA I/O drivers. Configures the connection of trigger inputs and strobe outputs from the 12-pin Trigger/Strobe Connector to the two 7-pin Camera power and I/O connectors. For Sapera LT and *Sherlock*, the driver default (no configuration file) is 2 separate triggers, and strobe outputs enabled. You can make changes and save them to a file for use with *Sherlock*. Example files are included on the GEVA. iNspect has its own separate configuration of the GEVA I/O.
- DCI-100 I/O drivers. Configures the programmable logic thresholds on the DCI-100 Module, through the GEVA or PC serial port. The DCI-100 provides a way to connect camera power and I/O, separate from the GEVA camera power and I/O connectors.
- Acquisition driver for the *iNspect* application. Cameras are ordered by IP Address when using the generic configuration file. Cameras are ordered by their Serial Number when using a custom configuration file, as described in Appendix D.
- Acquire and display images. The default camera settings of this program are temporarily written to the camera, to allow display in this utility. The camera settings in this program are not used by the other application programs. Note: Changing the Camera Name in this program may make the camera inaccessible to the Sherlock and SaperaLT software.

Sapera CamExpert

- Change camera configuration settings, such as exposure time, white balance, gain, color output format. Gain and exposure time can also be changed from Sherlock and iNspect.
- Save camera settings to the camera memory or a configuration file. You can configure the camera to load either your saved settings, or the factory settings, at power up. The preferred method is to save your settings to both the camera and a configuration file. Sherlock can load a configuration file at startup. If multiple configurations are needed, you can save them to camera configuration files. Several example configuration files are included on the GEVA.
- Acquire and display images. Changes to the camera settings are temporary, unless saved to the camera memory or to a configuration file.

SaperaLT Runtime

- Acquisition utility for the *Sherlock* software. Sapera LT is used with the drivers in the Genie Framework.

Genie Framework

- Genie camera acquisition drivers for the SaperaLT and *Sherlock* software. Genie camera firmware update utility. A System tray icon provides status on the Genie camera connections. (available, unavailable, disconnected).

- Sapera Network Configuration Tool. Note: Changing the Camera Name in this program may make the camera inaccessible to the Sherlock and SaperaLT software. Advanced–Recover Camera can be used to reset the camera IP Address to DHCP/LLA, following the display steps.

Sherlock

- Image processing library and Integrated Development Environment (IDE) with a Graphical User Interface (GUI) used to design, test, debug, and deploy machine vision applications.
- Sherlock uses the Sapera LT library and Genie Framework drivers for image acquisition. The "Sapera LT" driver must be enabled in the Acquisition Options. You may point to a Sapera CamExpert camera configuration file.
- Sherlock uses the VA-Genie Setup drivers for the Industrial I/O and Camera I/O. The "IFC" driver must be enabled in the Acquisition Options. You may point to a VA-Genie Configuration file if you have made changes to the default I/O configuration; for example, disabling strobe outputs.

Sapera Acquisition Wizard

- This Sherlock utility detects all available hardware or cameras supported under Sapera LT, and creates a file "SaperaLTDrv.ini" that identifies the cameras by their Camera Name. You can enable or disable camera ports, and select camera configuration files in this utility. NOTE: If this configuration file does not match the number of cameras (if two cameras are enabled, but one camera is later disconnected) the Sapera LT and Genie drivers will not load, and Sherlock will not run saved programs. Sherlock will open a new "investigation" file.

iNspect

- Inspection application with Graphic User Interface (GUI) for easy setup of product inspection.
- iNspect uses the VA-Genie Setup drivers for camera acquisition. iNspect maintains its own settings and control over the camera settings and I/O.

Acronis True Image

- GEVA systems contain a factory restore image on the hard drive. During system boot, press the F9 key to start the Acronis software, and restore the factory settings. Any configuration changes made after receiving your GEVA are lost.
- The Acronis software also allows you to create new system backup images. New images cannot be stored in the recovery partition on the hard drive. You can use a USB flash drive, external CDRW drive, or network storage.

APPENDIX A
CONNECTORS AND PINOUTS

This section provides the connector pinout information for each of the GEVA external interfaces. All rear panel connections are made with Molex connectors, included with the GEVA chassis.

Camera Power and Control Connectors

Camera control signals and power are available on two 7-pin Molex connectors, located on the rear panel. The pinout for the connectors are shown below. Color codes for the DALSA cable are given in this table. Each cable can supply up to 500 mA at +12 Volts from chassis power, protected by a fusable link.

Camera Port Connector Pinout

7-pin Molex	*GEVA Label*	*Color*		*Camera Function*	*Direction*	*12-Pin Hirose*
1	TRIG	White		Trigger on IN2+	Camera In, GEVA Out	11
2	STRB	Orange		Strobe on OUT2+	Camera Out, GEVA In	7
3	CIN1	Green		IN1 +	Camera In, GEVA Out	6
4	COUT1	Blue		OUT1 +	Camera Out, GEVA In	4
5	I/O COM	Brown		– for all I/O		3, 5, 8, 12
6	12V	Red		+12 Volt Power	Camera Power input	2
7	GND	Black		Power Ground		1

Cameras pins 3, 5, 8, 12 are connected together through the connector shell and grounded by the brown wire to I/O COM on the Molex connector.

GEVA supplies 12 Volts at 500 mA maximum to each camera connector through a fusable link.

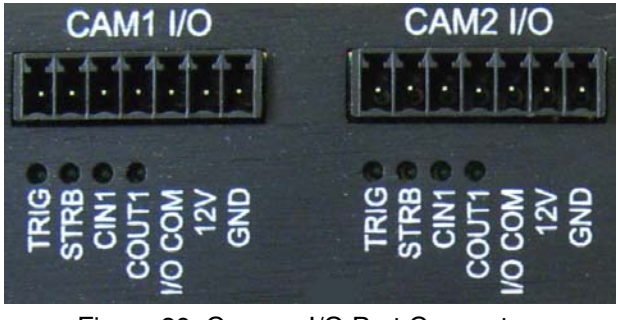

Figure 20. Camera I/O Port Connectors

Camera Data Connectors

The GigE camera data ports are standard Ethernet RJ-45 8-pin male connectors, located on the front panel. Camera Port One is assigned a Static IP Address 10.1.64.5 and Camera Port Two is assigned a Static IP Address 10.1.128.7. Both ports use the Subnet Mask 255.255.192.0 standard for a 10.x.x.x address.

The VA-Genie Camera Setup program configures the cameras for compatible Static addresses. The Ethernet ports are also configured for Jumbo Frames and maximum Receive Descriptors (as described in the Genie Camera Manual).

Camera Port 1 is defined in Windows as PCI Bus 4 Device 0. Camera Port 2 is defined in Windows as PCI Bus 3 Device 0. This information may be needed if you must install a custom hardware driver.

Ethernet Pinout

Pin	Name	Description
1	BI_DA+	Bi-directional pair A +
2	BI_DA–	Bi-directional pair A –
3	BI_DB+	Bi-directional pair B +
4	BI_DC+	Bi-directional pair C +
5	BI_DC–	Bi-directional pair C –
6	BI_DB–	Bi-directional pair B –
7	BI_DD+	Bi-directional pair C +
8	BI_DD–	Bi-directional pair C +

Power Connector

The GEVA is powered from an external supply that connects to the 3-pin molex connector on the rear panel. The power requirements are:

+24 V +/–10% @ 2.5 A maximum or 60W.

Power Connector Pinout

Pin	*Name*	*Direction*	*Description*
1	Earth	–	not connected
2	GND	–	Ground
3	24V	Input	DC Power +24 Volts

A power cable (A-CAB-NSII-PWR), with open leads on one end and a mating connector plug on the other, is shipped standard with the product.

Input Connector

The GEVA digital inputs are available on one 12-pin Molex connectors, located on the rear panel. Inputs are opto-isolated and polarity insensitive. Some inputs share "Common" pins. Electrical specifications are given on page 28 and connection configurations are illustrated on page 29.

Input Connector Definitions

Pin #	*Label*	*Definition*
1	IN0	Input 0
2	IN1	Input 1
3	IN2	Input 2
4	IN3	Input 3
5	COM[0:3]	Common for Inputs 0–3
6	IN4	Input 4
7	IN5	Input 5
8	IN6	Input 6
9	IN7	Input 7
10	COM[4:7]	Common for Inputs 4–7
11	SOLN	Switch Solution input for iNspect
12	COM	Common for the Switch Solution input

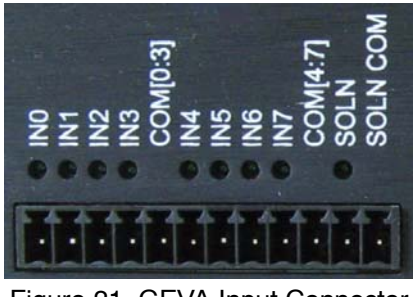

Figure 21. GEVA Input Connector

Output Connector

The GEVA digital outputs are available on one 10-pin Molex connector, located on the rear panel. Outputs are solid state and polarity insensitive. Some outputs share "Common" pins. Electrical specifications are given and connection configurations are illustrated on page 30.

Output Connector Definitions

Pin #	*Label*	*Definition*
1	OUT0	Output 0
2	OUT1	Output 1
3	OUT2	Output 2
4	OUT3	Output 3
5	COM[0:3]	Common for Outputs 0–3
6	OUT4	Output 4
7	OUT5	Output 5
8	OUT6	Output 6
9	OUT7	Output 7
10	COM[4:7]	Common for Outputs 4–7

Figure 22. GEVA Output Connector

Trigger/Strobe/Power Connector

The trigger inputs, strobe outputs, and auxilliary power outputs are available on one 12-pin Molex connector, located on the rear panel. Inputs and Outputs are solid state and polarity insensitive. Each input and output has its own "Common" pin. Electrical specifications and connection diagrams appear on pages 28 through 30.

Trigger/Strobe/Power Connector Definitions

Pin #	*Label*	*Definition*	*Direction*
1	TRIG1 IN	Trigger 1 input for Camera 1	GEVA Input
2	TRIG1 COM	Common for Trigger 1	
3	TRIG2 IN	Trigger 2 input for Camera 2	GEVA Input
4	TRIG2 COM	Common for Trigger 2	
5	STRB1 OUT	Strobe 1 output from Camera 1	GEVA Output
6	STRB1 COM	Common for Strobe 1	
7	STRB2 OUT	Strobe 2 output from Camera 2	GEVA Output
8	STRB2 COM	Common for Strobe 2	
9	12V OUT	12 Volt DC output @ 500 mA max.	
10	PWR GND	Ground for 12 Volts & 5 Volts	
11	5V OUT	5 Volt DC output @ 500 mA max.	
12	PWR GND	Ground for 12 Volts & 5 Volts	

Pins 10 and 12 are internally connected.

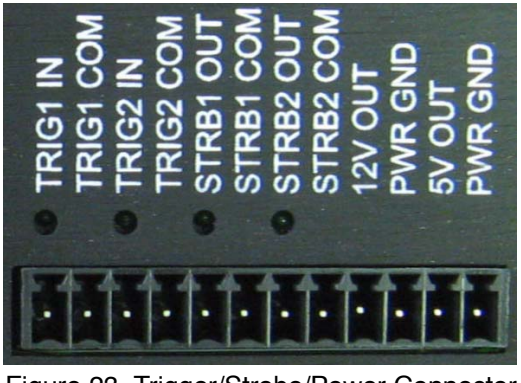

Figure 23. Trigger/Strobe/Power Connector

Local Access Network (LAN) Connector

The 10/100/1000 Ethernet RJ-45 connector is an 8-pin male connector. The factory default is DHCP or Dynamic IP Addressing. You can use this port for a third camera if you do not need a network connection. This port is defined in Windows as PCI Bus 1 Device 0. This information may be needed if you must install a custom hardware driver.

NOTE *Do not enable "Jumbo Frames" on this port if your network does not support it. Enabling "Jumbo Frames" when not supported may cause difficulty accessing the network.*

Ethernet Pinout

Pin	Name	Description
1	BI_DA+	Bi-directional pair A +
2	BI_DA–	Bi-directional pair A –
3	BI_DB+	Bi-directional pair B +
4	BI_DC+	Bi-directional pair C +
5	BI_DC–	Bi-directional pair C –
6	BI_DB–	Bi-directional pair B –
7	BI_DD+	Bi-directional pair C +
8	BI_DD–	Bi-directional pair C +

USB Connectors

The two USB 2.0 connectors are identical, rectangular type-A, 4-pin sockets.

USB Pinout

Pin	Name	Direction	Description
1	VCC	Out	Power, +5 V (1 A max)
2	DATA–	I/O	Data–
3	DATA+	I/O	Data+
4	GND	–	Ground

Display Connector

The GEVA provides standard 15-pin female D-Sub connection for Display.

Display Pinout

Pin	*Name*	*Direction*	*Description*
1	RED	Out	Red
2	GREEN	Out	Green
3	BLUE	Out	Blue
4	NC	–	not connected
5–8	GND	–	Ground
9	+5V	Out	+5 V
10	GND	–	Ground
11	NC	–	not connected
12	SDA	I/O	Serial data
13	HS	Out	Horizontal Sync
14	VS	Out	Vertical Sync
15	SCL	I/O	Serial data clock

Serial Connector

The GEVA provides standard 9-pin male D-Sub connection for serial port.

Serial Pinout

Pin	*Name*	*Direction*	*Description*
1	DCD	In	Data Carrier Detect
2	RXD	In	Receive Data
3	TXD	Out	Transmit Data
4	DTR	In	Data Terminal Ready
5	GND	–	Ground
6	DTS	Out	Data Set Ready
7	RTS	Out	Request to Send
8	CTS	In	Clear to send
9	RI	In	Ring Indicator

APPENDIX B
USING PHOTO-SENSORS

HTM Electronics Industries (http://www.htm–sensors.com) and Banner Engineering Corp. (http://www.bannerengineering.com) and several other manufacturers make photoelectric sensors that do not require de-bouncing. The HTM Electronics MP-D0380D-CX9Q4UE infrared sensor, and the Banner Engineering R55F series photoelectric sensors and the SM312 LVAGMHSQD photoelectric sensor have been used successfully with the Vision Appliance. These sensors are rated to operate on 10 to 30 VDC.

The following diagram shows how to connect these photoelectric sensors. The wiring is:

Brown - Power (+16 to +30 Volts DC)

Blue - Ground

Black - Signal from photoelectric sensor. Goes high (to about the power voltage) when triggered.

The other two wires are *not needed* for using the sensor with the Breakout Board. These two wires are:

White - Signal from photoelectric sensor – connects a small load to ground (see sensor specification)

Gray - Can be connected to a switch to ground; when closed, enables Remote Teach

The photoelectric sensor draws power from the brown and blue leads. When the photoelectric sensor is triggered the output (black lead) goes high (to about the power supply voltage).

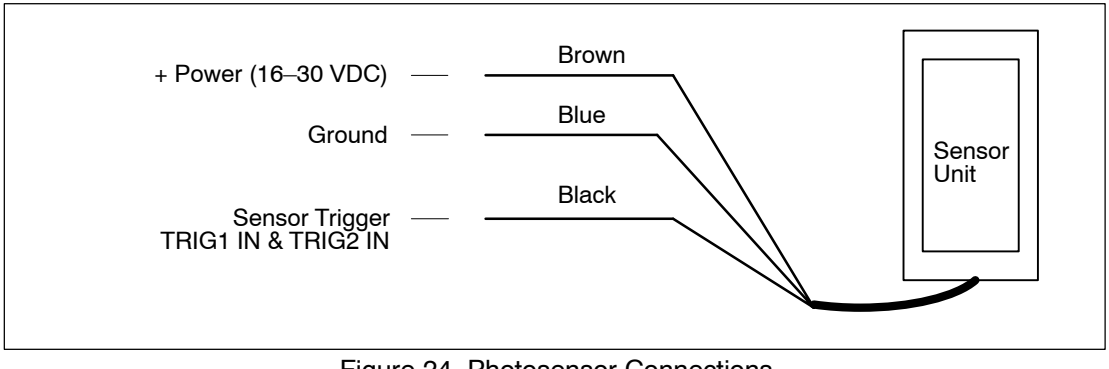

Figure 24. Photosensor Connections

APPENDIX C
DIGITAL I/O ASSIGNMENTS

The General Purpose Inputs and Ouputs defined in software are associated with the following inputs and outputs.

iNspect I/O

iNspect GEVA I/O Definitions

iNspect Name	***Read Source***
GPI0	GEVA Input Connector, IN0
GPI1	GEVA Input Connector, IN1
GPI2	GEVA Input Connector, IN2
GPI3	GEVA Input Connector, IN3
GPI4	GEVA Input Connector, IN4
GPI5	GEVA Input Connector, IN5
GPI6	GEVA Input Connector, IN6
GPI7	GEVA Input Connector, IN7
GPI8	GEVA Trigger/Strobe Connector, TRIG1 IN
GPI9	GEVA Trigger/Strobe Connector, TRIG2 IN
	Write Destination
GPO0	GEVA Output Connector, OUT0
GPO1	GEVA Output Connector, OUT1
GPO2	GEVA Output Connector, OUT2
GPO3	GEVA Output Connector, OUT3
GPO4	GEVA Output Connector, OUT4
GPO5	GEVA Output Connector, OUT5
GPO6	GEVA Output Connector, OUT6
GPO7	GEVA Output Connector, OUT7
GPO8	GEVA Trigger/Strobe Connector, STRB1 OUT
GPO9	GEVA Trigger/Strobe Connector, STRB2 OUT

Note 1: Additional inputs and outputs may appear when supported programmable I/O hardware is added.

Sherlock I/O

Sherlock GEVA Input Definitions

Sherlock Name	***Read Source***
Input Channel 0	GEVA Input Connector, IN0
Input Channel 1	GEVA Input Connector, IN1
Input Channel 2	GEVA Input Connector, IN2
Input Channel 3	GEVA Input Connector, IN3
Input Channel 4	GEVA Input Connector, IN4
Input Channel 5	GEVA Input Connector, IN5
Input Channel 6	GEVA Input Connector, IN6
Input Channel 7	GEVA Input Connector, IN7
Input Channel 8	GEVA CamPort 1 Connector, GPO IN (state of the camera output 1)
Input Channel 9	GEVA CamPort 2 Connector, GPO IN (state of the camera output 1)
Input Channel 10	GEVA CamPort 1 Connector, STRB IN – See note 2
Input Channel 11	GEVA CamPort 2 Connector, STRB IN – See note 2
Input Channel 12	GEVA Trigger/Strobe Connector, TRIG1 IN
Input Channel 13	GEVA Trigger/Strobe Connector, TRIG2 IN
Input Channel 14	Genie Camera 1, Input1
Input Channel 15	Genie Camera 1, Input2 (trigger)
Input Channel 16	Genie Camera 2, Input1 – if a camera is connected
Input Channel 17	Genie Camera 2, Input2 (trigger) – if a camera is connected

Note 1: Additional inputs and outputs may appear when more cameras or supported programmable I/O hardware are added.

Note 2: The strobe inputs are dedicated to strobe funcitonality, and do not read the input state for any other functionality.

Sherlock GEVA Output Definitions

Sherlock Name	***Write Destination***
Ouput Channel 0	GEVA Output Connector, OUT0
Ouput Channel 1	GEVA Output Connector, OUT1
Ouput Channel 2	GEVA Output Connector, OUT2
Ouput Channel 3	GEVA Output Connector, OUT3
Ouput Channel 4	GEVA Output Connector, OUT4
Ouput Channel 5	GEVA Output Connector, OUT5
Ouput Channel 6	GEVA Output Connector, OUT6
Ouput Channel 7	GEVA Output Connector, OUT7
Ouput Channel 8	GEVA LED1
Ouput Channel 9	GEVA LED2
Ouput Channel 10	GEVA LED3
Ouput Channel 11	GEVA Trigger/Strobe Connector, STRB1 OUT – See note 2
Ouput Channel 12	GEVA Trigger/Strobe Connector, STRB2 OUT – See note 2
The Genie camera outputs may appear, if configured to static output, not a strobe or pulse	
Ouput Channel 13	Genie Camera 1, output 1
Ouput Channel 14	Genie Camera 1, output 2
Ouput Channel 15	Genie Camera 2, output 1 – if a camera is connected
Ouput Channel 16	Genie Camera 2, output 2 – if a camera is connected

Note 1: Additional inputs and outputs may appear when more cameras or supported programmable I/O hardware are added.

Note 2: Strobe Outputs may be written to if the Strobe functionality is disabled in IfcDrv.ini.

APPENDIX D
GENIE CAMERA SETUP

NOTE *You should perform a firmware update with any new Genie camera. The firmware update utility is available from the Windows Start button.*

Verify or Set the Camera IP Address

Genie cameras used with the GEVA, must use a Static IP address. If you received cameras labeled "Camera1" and "Camera2" or "CamPort1" and "CamPort2" the address has already been set. You can skip forward to "Verify or Update Firmware" or "Camera Configuration Settings."

If the cameras are not labeled, you can follow these steps to configure the camera addresses.

Connect one camera at a time to the GEVA. A camera icon in the system tray indicates the camera status (not on all OS). Right-click on the camera icon, and select "SHOW Status Dialog Box". Or use Start–Programs–DALSA–Sapera Network Imaging Package–DALSA GigE Vision Device Status.

If the camera IP address does not match the expected IP address for the Gigabyte Ethernet port, an "IP Error" is indicated, as shown Figure 25.

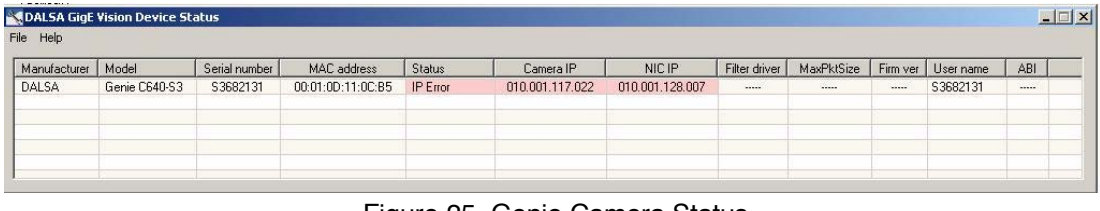

Figure 25. Genie Camera Status

To automatically assign a compatible IP address, launch the VA-Genie Camera Setup program (Start>Programs>VA Genie Tools> VA Genie Setup). If the IP address for the camera needs to be changed, a dialog box will appear before the VA Genie Camera Setup program opens, stating the camera is being assigned a compatible IP address. After the IP address is assigned, the VA-Genie Camera Setup program opens (Figure 26).

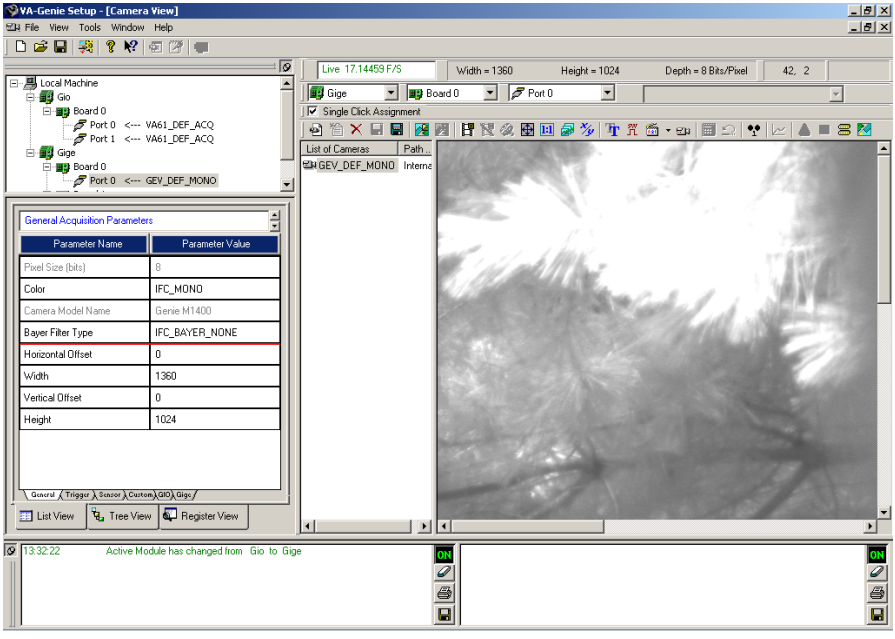

Figure 26. VA-Genie Camera Setup Utility

The VA-Genie Camera Setup program can be closed after the IP address is assigned. You do not need to save any settings from this program. Sherlock and iNspect do not use camera settings from the VA-Genie Setup program. You can use this program to customize the I/O settings for the Camera's Power and I/O Connectors for use with Sherlock. Or you can use one of the files included with the GEVA at D:\VAGenie\Config. The camera settings are deleted in these files because they are not used by Sherlock.

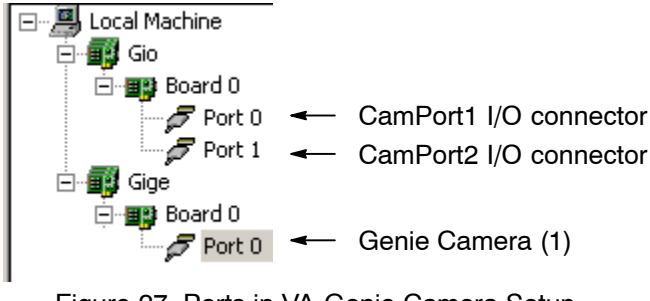

Figure 27. Ports in VA-Genie Camera Setup

Verify or Update the Camera Firmware

1. Open the Firmware Update tool:
   Start>Programs>DALSA>Genie>Firmware Update
2. If the "Update" column shows "Not Required" (as shown Figure 28) click "Cancel".
3. If the "Update" column shows "Required" click the "Automatic" button.

You do not need a Internet connection to perform this update.

4. When the update is complete, click "Yes" to close the utility.

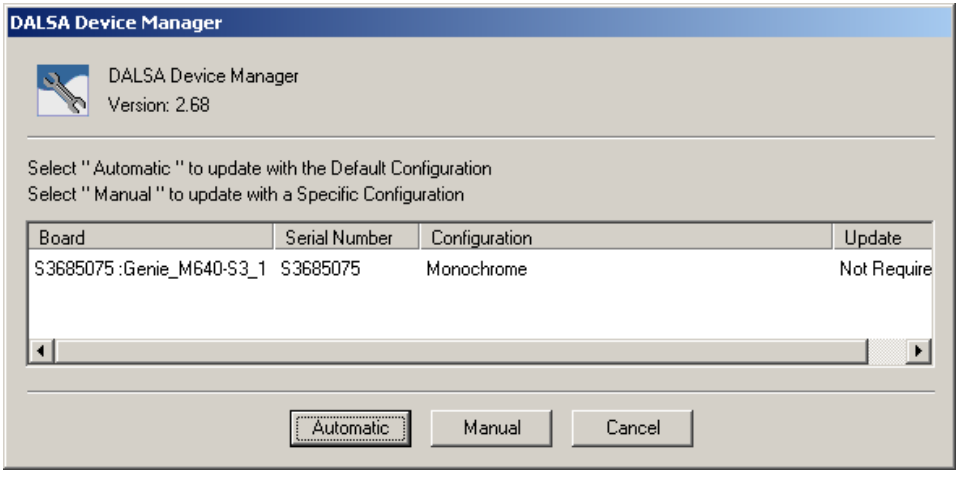

Figure 28. Firmware Update Tool

If more cameras need IP addresses changed, unplug the current camera(s) from the Ethernet port before connecting the next camera. Connect each camera, one by one, directly to the GEVA, even if you will use a GigE Switch or Router later. Connect the camera to the port it will finally be connected to. Cameras are not interchangeable between Camera Port 1 and Camera Port 2.

If you are using **iNspect**, you do not need to complete any of the remaining steps in this Appendix. The rest of this Appendix applies to Sherlock setup. You may wish to skip forward to the section on Distributed Networks, on page 67, or Changing Out Cameras on page 70.

For **Sherlock** users, after all cameras have been assigned compatible IP addresses, unplug the last camera. If you are using a switch or hub, connect it to the GEVA. Connect the cameras one by one, in the order you want them to appear in Sherlock. Wait for a camera to appear in the Status window (Figure 25) before plugging in the next camera.

Camera Configuration Settings

The Genie cameras store the configuration settings (I/O, shutter speed, white balance) in memory (EEPROM).

1. Open the Sapera CamExpert program (Start>Programs>Dalsa>Sapera LT>CamExpert). See Figure 29.

NOTE ***For all color cameras,*** *you must perform or repeat "White Balance" calibration after the camera is in its final location and has final illumination and exposure setting. White balance calibrates or compensates for changes in illumination.*

All connected cameras are listed under the Device "pane" in the CamExpert utility.

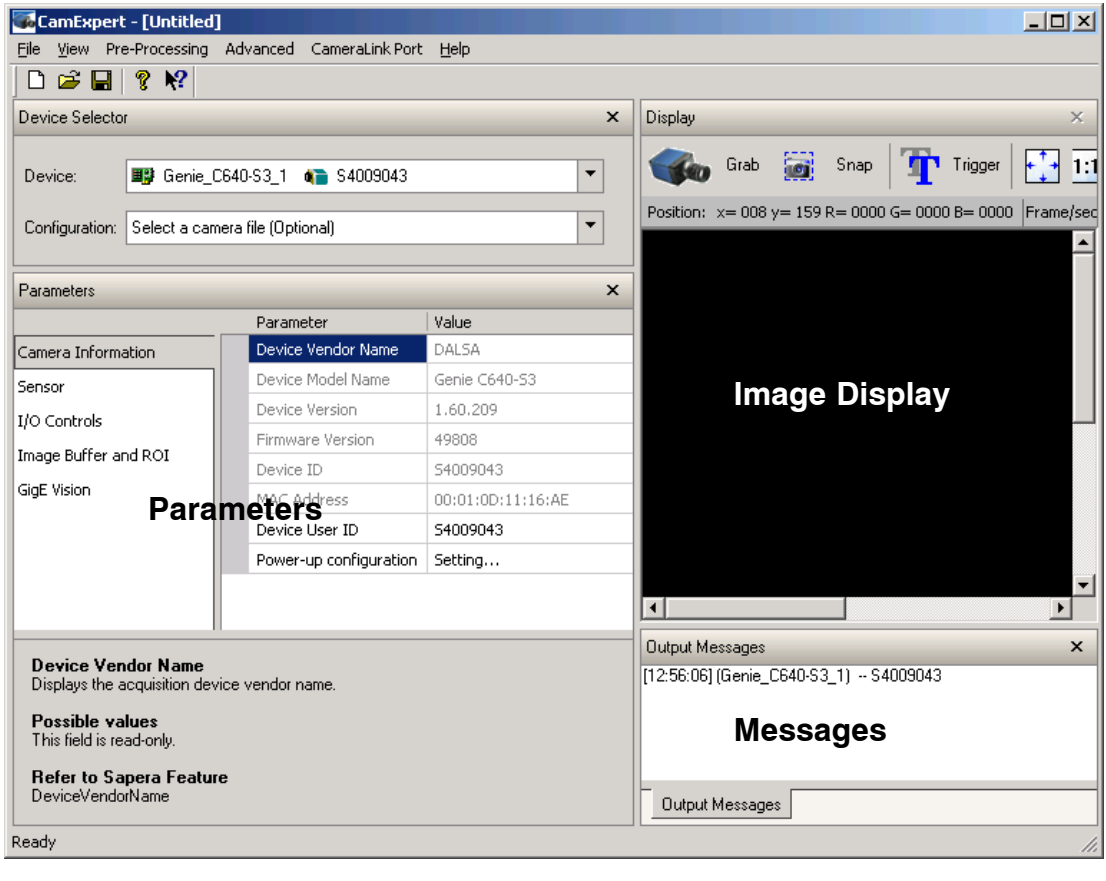

Figure 29. The CamExpert Window

2. If more than one camera is connected, pull down the "Device" list and click on the camera name ("Camera1" in Figure 30) to select that camera for editing. The parameter settings for the selected camera, are displayed in the Parameters pane.

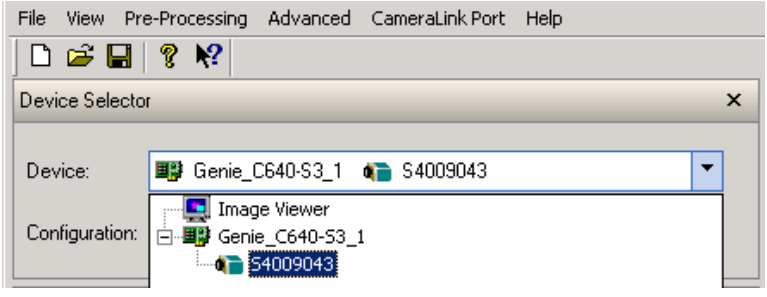

Figure 30. Selecting a Camera

Several Camera Configuration files are included on the GEVA, in the CamExpert default directory: D:\DALSA\Sapera\CamFiles\User. You can load a file that matches the model of your camera. First click on the camera name ("Camera1" in Figure 30) and then click the file open button, or select File>Open.

You may get an error message, for one of these reasons:

- The camera's firmware is out of date.
- The camera type does not match the file (color vs monochrome).
- The file's image format is too large for the camera model.
- The saved file is out of date, or not compatible with the newer camera firmware.

The following pages and steps show how to set your own configuration.

Device Name

Sherlock and Sapera LT identify cameras by their Device Name or User Device ID. iNspect identifies cameras by Serial Number. The factory default Device Name is the camera serial number, as shown in Figure 31. You can change the name to something more useful to you, for example: "Camera1" or "TopView".

1. Click in the field to the right of "Device User ID". Enter a new name.

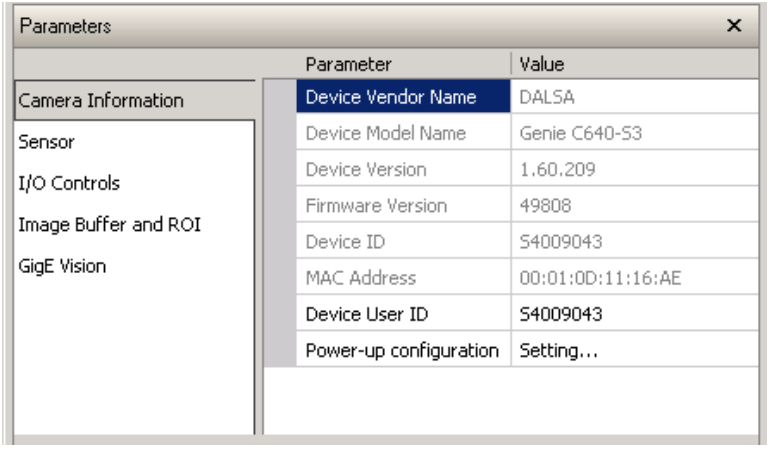

Figure 31. Camera Name

Packet Size

The Camera's "Packet Size" should be adjusted to match the Network Interface speed.

1. Click on the "GigE Vision" tab (Figure 32).
2. Click on "Automatic" beside "Network Configuration" and change the value to "Optimize". The value for "Packet Size" should change. (8192 in Figure 32). If the packet size is 1500 it means either the ethernet port is not a GigE port or the "Jumbo Frames" attribute is not set on the port.

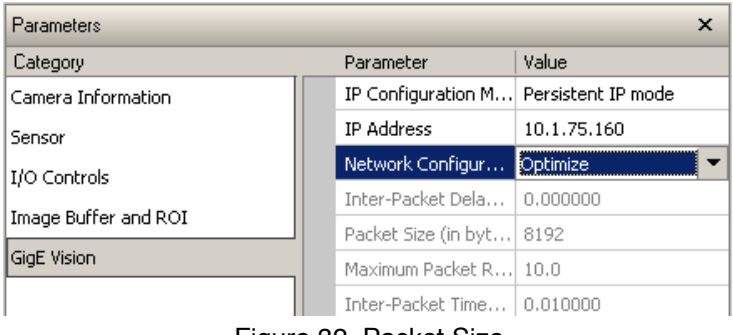

Figure 32. Packet Size

Color Mode

For all color cameras (such as C640, C1024 C1400 and C1600 models),

1. Click on the "Image Buffer" tab (Figure 33).
2. Change the Pixel Format parameter to RGB 32-bit. (Sherlock does not support Raw 8, YUY2 or UYVY input.)

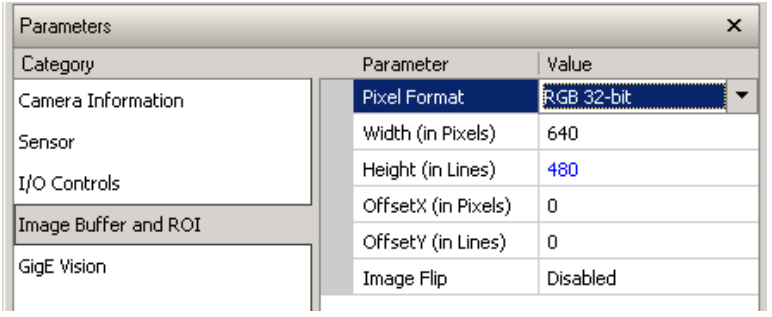

Figure 33. Setting the Color Mode

White Balance

Color Calibration (White Balance) should be performed on every color camera. (White Balance can also be performed in iNspect.)

1. Place a white object under the camera, adjust the aperture on the lens so that the white object is not bloomed out. It is best that entire field of view is white.
2. Click on the "Sensor" tab (Figure 34, color camera shown).
3. Click on "Setting" beside "Color Calibration" and a dialog box will open.

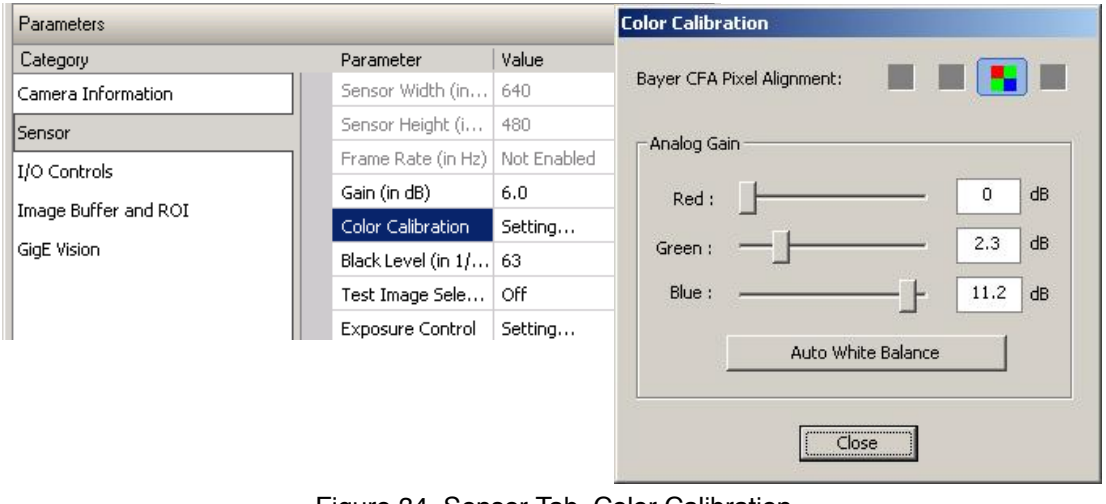

Figure 34. Sensor Tab, Color Calibration

4. Click the "Auto White Balance" button.

NOTE *The camera must acquire images to perform a White Balance. The camera should be free running, or you should supply a trigger using an external trigger signal, or click on the Trigger button above the Image display pane.*

Trigger and Strobe

1. Click on the "I/O Controls" tab (Figure 35).
2. Change the value beside "Trigger" to "True" to enable the external trigger mode.

Sherlock always uses triggered mode. This setting will be overwritten by Sherlock if you select FALSE (FALSE is free-running).

Genie cameras have 2 inputs and 2 outputs on the 12-pin Hirose connector, that can be used as camera trigger input, strobe output, and general purpose I/O. The GEVA only uses Input 2.

3. Select Input 2 as the Trigger Source, if the trigger is coming from the 7 pin connector on the GEVA. You can use either Input 1 or Input 2 if you are triggering the camera directly (not through the GEVA connectors), or through the DCI-100 connectors.

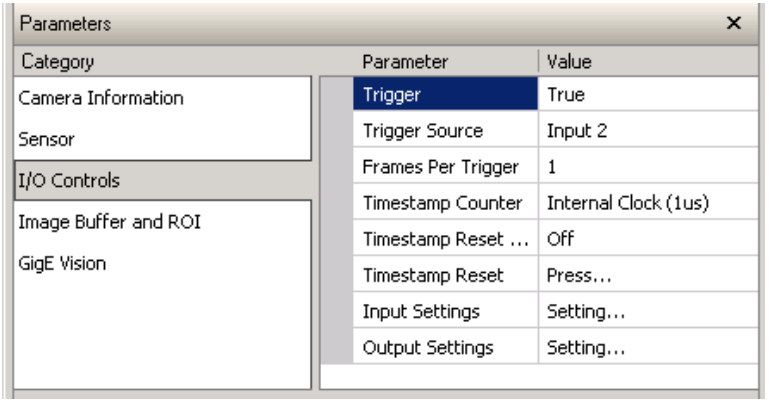

Figure 35. I/O Tab

4. Click on "Setting" beside "Input Settings" in the I/O Controls panel (Figure 35) to open the Input Settings window (Figure 36). Change to Active High or Active Low as needed to match the hardware signals.

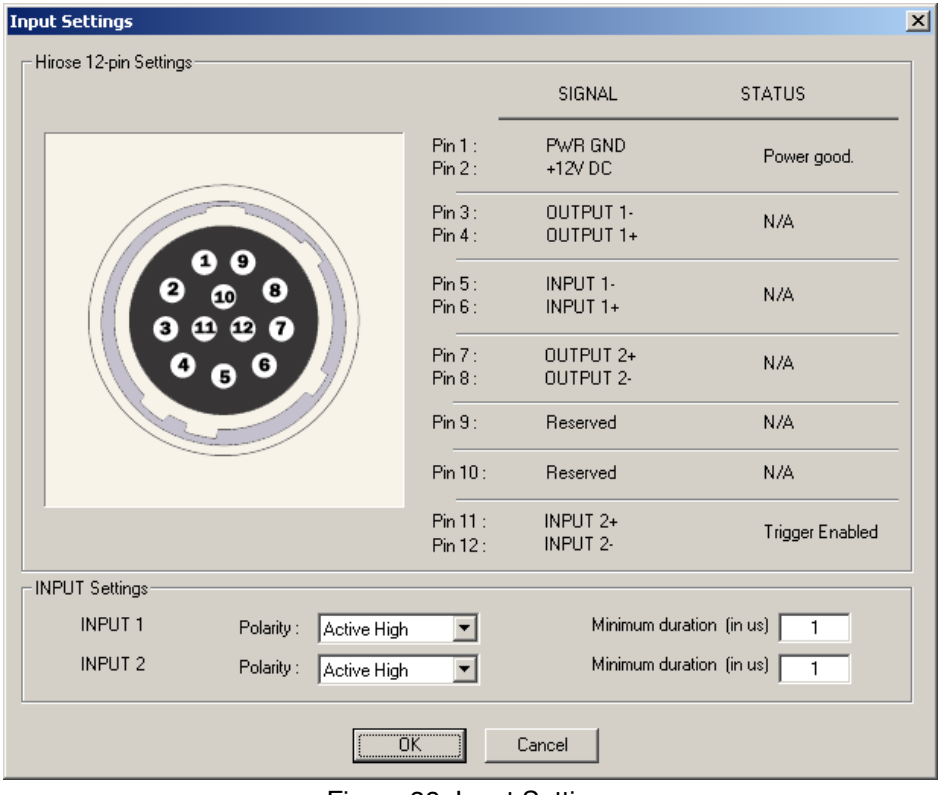

Figure 36. Input Settings

5. Click on "Setting" beside "Output Settings" in the I/O Controls" panel (Figure 35), to open the Output Settings window (Figure 37).

The GEVA uses only Output 2. The DCI-100 supports both Output 1 and Output 2.

6. Configure the "Event Mode" and the Strobe Out delay and duration. Always use "Active Open" in the second field (see figure) with the GEVA.
7. Click on "Output 2" at the top of this window.
8. Configure the "Event Mode" and the Strobe Out delay and duration. Always use "Active Open" in the second field (see figure) with the GEVA.

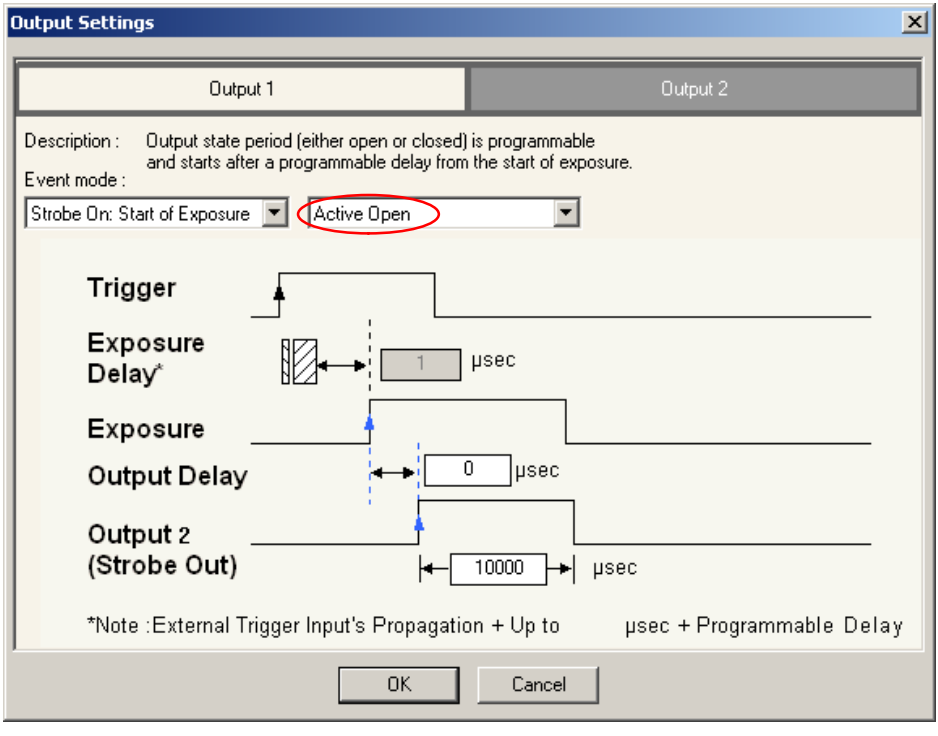

Figure 37. Output Settings

NOTE *If the Event Mode for either Output1 or Output2 is set to "Close" or "Open" these outputs will appear in Sherlock's "digital outputs" and change the standard output channel number assignments. If Output1 and Output2 are set to Strobe or Pulse functions, they will not appear in Sherlock's digital outputs.*

Gain

The Analog Gain can be adjusted.

1. Click on the "Sensor" tab and scroll down if necessary (Figure 38).
2. Change the value to the right of "Gain (in db)" in the Sensor panel.

Increasing the value will make the picture brighter.

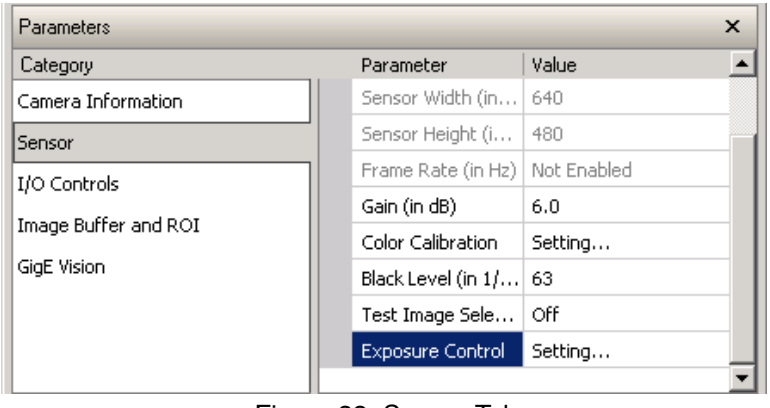

Figure 38. Sensor Tab

Exposure Time

1. Click on the "Sensor" tab (Figure 38).
2. Click on "Setting" beside "Exposure Control" to open the Exposure Control window (Figure 39).
3. Change the value in the box to the right of "Exposure." Figure 39 shows a 10 ms (10,000 us) exposure time. You can increase or decrease this amount.
4. Synchronization should be "Reset" as shown in Figure 39.

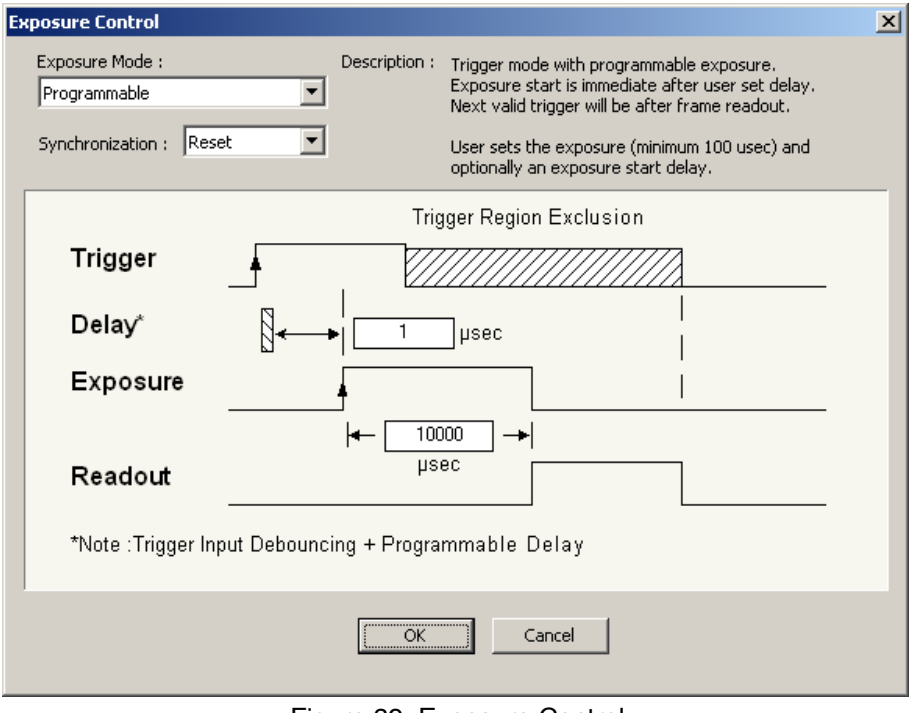

Figure 39. Exposure Control

Saving Your Camera Settings

After the camera configuration has been changed, it needs to be saved in the camera's EEPROM.

1. Click on the "Camera Information" tab (Figure 40).
2. Click on "Setting" beside "Power up Configuration".

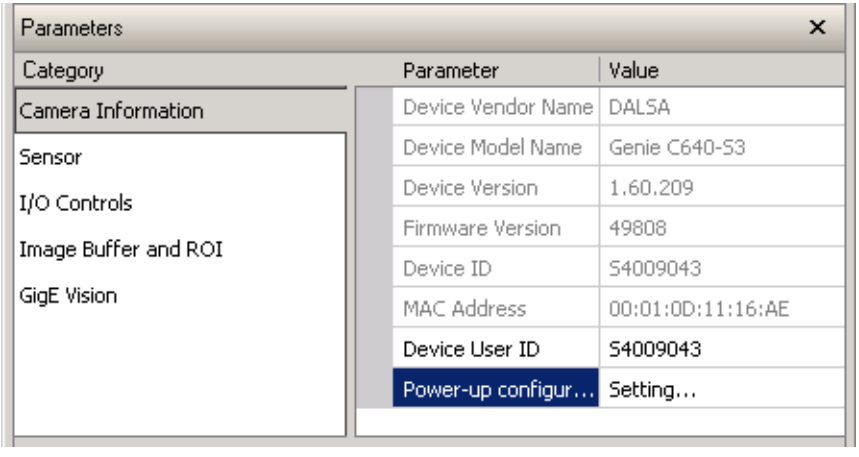

Figure 40. Camera Information Tab

3. Change the "Camera Power-up configuration" to "Camera Configuration 1".
4. Change the "Save configuration in Camera" to "Camera Configuration 1" and click "Save".

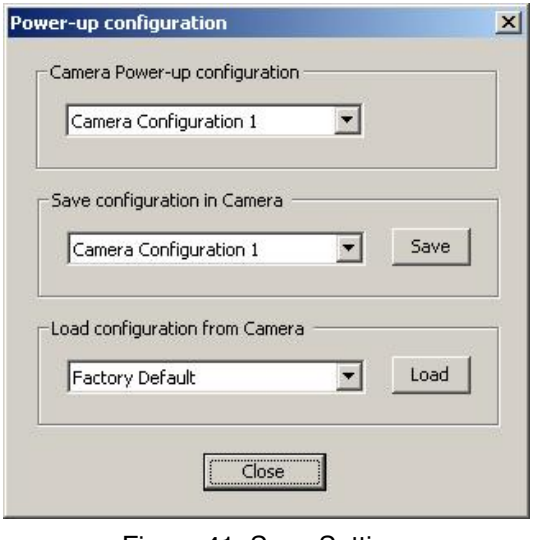

Figure 41. Save Settings

You should also save your configuration settings to a Camera Configuration file.

5. In the main CamExpert window, click the "file save" button or select "File>Save".
6. Change the "Camera Mode" and "Configuration" fields to describe your camera settings. For example; change the "Camera Mode" to "EdgeTrigger" and change the "Configuration" to "10msExposeandStrobe" (or something that matches your operation, or product line). Notice the camera file name changes to match your entries.
7. Use the default directory.
8. Click "Save".

The camera configuration should be saved to the memory of **every** camera in the device list. You can repeat the process for each camera if they will be different. If all cameras are the same model and same settings, you can load the Camera Configuration file you just saved, and then save the settings to each camera's memory.

When you are finished setting up all cameras, close CamExpert.

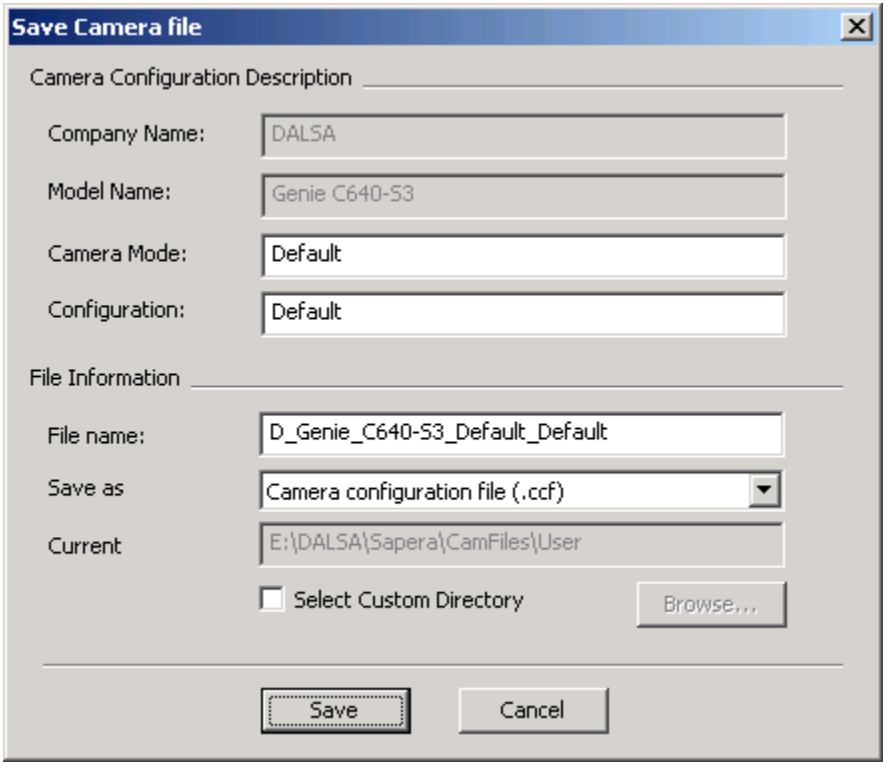

Figure 42. Saving and Naming Configuration File

Sherlock Configuration Files

If you are using Sherlock 7, use the Sapera Acquisition Wizard to configure Sherlock.

1. With Sherlock closed click on the desktop Icon for Sapera acquisition wizard, or click on: Start>Programs>Dalsa Industrial Products>Sherlock> Sapera Acquisition Wizard.
2. Click "OK" if you get a message stating the configuration file does not match the hardware.
3. Make sure all cameras listed have "Enable" set to TRUE. (see Figure 43). The default state is only one camera enabled.

You should enable and select the camera configuration file you created, to force those settings in the camera each time Sherlock is loaded. This is preferable if you are opening and closing other programs. iNspect and Camera Configurator force their own default settings on the camera.

4. Click the "Save File" button and close the Sapera Acquisition Wizard.

NOTE *Cameras are listed in the order they were powered on and detected by the Network Vision software.*

Changing the Camera Order

The cameras will be ordered in Sherlock, in the same order as they appear in the Sapera Acquisition Wizard. If the order is not to your liking, there are two ways you can correct this.

a. Exit the wizard, disconnect the cameras, and reconnect them in the order you desire. Use the SHOW Status Dialog Box to monitor when the cameras are recognized. Open the Sapera Acquisition Wizard and create a new file following the steps above.

b. Save the configuration file from the Acquisition Wizard, and Exit. You can edit the SaperaLTDrv.ini file (found in Sherlock\Drivers) using Notepad or Wordpad. If all cameras are the same type, you can copy and paste the camera names in the correct order. Or, correct the references to "Server0" and "Server1" to match the order you want your cameras to follow. Notice that each "Server#" appears twice in the configuration file. For example, "Server0", "Server0_Device0", "Server1" and "Server1_Device0".

Each time you run Sherlock it will use the order saved in the SaperaLTDrv.ini file, that is created by the wizard. The order ***does not*** change every time the GEVA is rebooted.

NOTE *Each time you open the Sapera Acquisition Wizard, the order will change to the order of discovery (or power-on order). If you Click "Save File" the new order will overwrite the saved one, causing the order to change in Sherlock.*

Figure 43. Sapera Camera Acquisition Wizard

NOTE *The Wizard attempts to acquire or attach to all cameras discovered on a network. If you have multiple Vision Appliances and multiple cameras connected on a common "neighborhood" (for example an ethernet PLC controlling the cameras) the wizard will fail to open if visible cameras are already in use by other appliances. No error message is given in this case.*

Sherlock also uses the IFC driver and a VAGenie Setup configuration file to define the behavior of the GEVA I/O Connectors. The file \Sherlock\Drivers\IFCDrv.ini defines which I/O Configuration file is in use. This file can be viewed from Sherlock's Options–Acquisition menu.

Distributed Network Configurations

Difficulties can arise when multiple Vision Appliances or multiple Genie Cameras appear on a network. The fixed IP Addresses of Camera Ports 1 and 2 were designed to avoid this problem, by not making the cameras visible to the general network.

- **Configuration 1:** All cameras are connected (directly) to the Camera Ports on the GEVA, (with or without switches). The cameras are not visible to the other appliances, PLC, or networked equipment. The LAN port on the GEVA connects the Appliance to the local network or to a "Machine Network". Only the Appliance is directly visible to the PLC.

But some desirable configurations circumvent this design. One example is the "Machine Network" or a local network controlled by a PLC. Another is a GEVA on an office or building network that has Genie cameras attached to a PC or Appliance, and visible to the GEVA on the network connection.

- **Configuration 2:** All cameras are connected to a "Machine Network" (through GigE switches, hubs, or routers). The cameras are visible to the PLC, and also visible to all Vision Appliances (or PCs that have the Sapera Network Vision Software) on the network.

Configuration 2 allows the PLC to directly control (trigger) the cameras, but can present some challenges if there is more than one Vision Appliance present on the Machine Network. The problems presented, and their solutions, are discussed in the next two sections.

IMPORTANT: IP Address and Subnet Mask on a Machine Network

IP Addresses that start with 192.168.x.x can use the default Subnet Mask of 255.255.255.0. If your IP Addresses start with 10.x.x.x you must use the standard Subnet mask of **255.255.192.0**. The default Subnet Mask value will cause devices to disappear as more peripherals are attached.

iNspect

There are two problems specific to iNspect:

- Genie cameras connected through the network do not always follow the rules of ordering cameras by IP Address, as expected.
- When mixing Monochrome and Color Genie cameras on the same appliance or the same network, the application usually starts in Monochrome mode, not Color.

In both cases, the solution to the problem is to create a VA-Genie configuration file that specifically lists the cameras you desire, in their desired order, and does not contain the cameras you wish to ignore.

1. Open the VA-Genie Camera Setup utility:
   Start>Programs>VA Genie Tools>VAGenie Camera Setup

On the GEVA there are two "Gio" ports for I/O to the Camera and Power connectors, and one or more "Gige" ports for the Cameras connected, shown in the left panel (see Figure 44). If you have more Genie cameras connected through the network, or through GigE switches, there will be more "Gige" ports, one for each camera. If you have a DCI-100 connected to the serial port, the Digital I/O will also appear.

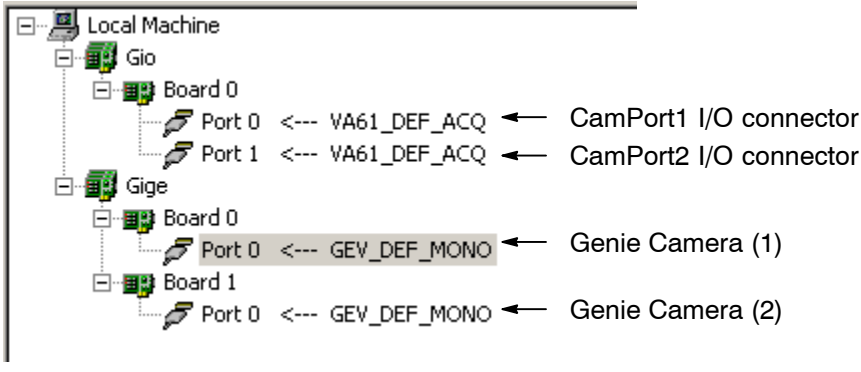

Figure 44. I/O Ports and 2 Cameras in VA-Genie Setup

iNspect uses the order of cameras as they appear in the "Gige" tree in the left panel of the VA-Genie Setup utility. They are normally ordered by their IP Addresses.

2. You can delete cameras, and change the order of cameras by right-clicking on the "Board #" under the "Gige" tree. Correct the tree so you have only the cameras controlled by this appliance, and they are in the correct order.
3. Pull down the File menu and select "Generate Portable Config File". Navigate to the D:iNspect\CameraFiles directory and save your configuration as "GEVcustom.txt". The "GEV" prefix is needed to make the file appear in the Camera and Language selector under the GigE camera group.
4. Close the VAGenie Camera Setup utility.
5. Open the Camera Selector and select the "Custom" GEV file. Click "Set".

iNspect uses the camera configuration file as a starting point, mainly for the camera order. The Sensor Setup panel settings override the configuration file settings, and are saved in your Solution file. The GIO port settings in your GEVtest.txt file are not used by iNspect. The GEVA does not use the GIOtest.txt file (used by the VA61).

The Configuration file created by VA-Genie Setup contains much more information than is actually used by the iNspect program. You can examine the default GEVtest.txt file in the iNspect directory (original copy in the iNspect\CamFiles directory), and edit out the unnecessary information in your custom configuration file.

Sherlock

- When you open the Sapera Acquisition Wizard to create a configuration file, it attempts to access or gain control of all Genie cameras visible on the network. If another PC or Appliance is running an application that uses some of the Genie cameras, Sapera Acquisition Wizard will fail to open.

There are two ways to solve this problem.

Using the Acquisition Wizard

1. Close all vision processing or configuration programs across the network, that use Genie cameras.
2. Open Sapera Acquisition Wizard to create a configuration file that defines all cameras. Do not select configuration files. Use the camera memory settings.
3. Copy this file to all systems.
4. Edit the file on each system, to enable only the cameras needed on that system. You do not have to delete the other cameras, as long as they are disabled (ENABLE = 0).
5. Once the configuration is correct on each system, DO NOT open Sapera Acquisition Wizard again. It will attempt to access all the Genie cameras, and fail to open, or will overwrite your working configuration file. You may want to make a copy of your corrected configuration file, as a backup.

Not Using the Acquisition Wizard

1. On each system, edit the file SaperaLTDrv–Genie.ini to match the number and names of cameras attached to each system. You can find the camera names in the Sapera Network Status, Sapera CamExpert, or VAGenie Camera Setup. The System Name is not important. A valid name must be entered, but the actual content is ignored. Rename the finished file SaperaLTDrv.ini.
2. Once the configuration is correct on each system, DO NOT open Sapera Acquisition Wizard. It will attempt to access all the Genie cameras, and fail to open, or will overwrite your working configuration file. You may want to make a copy of your corrected configuration file, as a backup.

Changing Out Cameras

Sherlock

Sapera LT and Sherlock identify cameras by the Device Name or Camera Name. The best way to swap in a new camera is to change the new camera's name to match the old camera being replaced.

1. You can find the old camera name in the SaperaLTDrv.ini file.
2. You can change the new camera's name using VA-Genie Camera Setup, CamExpert, or the Sapera Network Vision Configuration Tool.
3. DO NOT use the Sapera Acquisition Wizard to create a new configuration file. A new "Server Name" will be assigned and wil cause Sherlock to view the new camera as a different camera.

iNspect

iNspect uses the IP Address to order cameras if there is no custom configuration file. If you created a custom configuration file, iNspect identifies cameras by Serial Number.

You can edit your custom configuration file, or create a new one. There are two ways to create one. You can edit the text file GEVtest.txt to match your cameras, or you can use the VA-Genie Setup utiltiy to create a configuration file.

Using VA-Genie Setup

1. Use the VA-Genie Camera Setup program to assign a compatible IP Address, as previously described at the beginning of this Appendix. Or you can manually assign the same IP Address as the camera you are replacing (if you know the IP address).
2. If you have cameras connected directly to the Camera ports on the GEVA, the IP Address should sort them correctly. Notice the order of the "Gige" ports in the left panel of the VA-Genie Setup display (Figure 44). If the order is not correct, you need to create a custom configuration. (If you previously created a custom configuration file, you should repeat the process, and overwrite the older file.) You can edit the file in Wordpad, or save a new file from the Camera Configurator.
3. In the Configurator, right-click on a "Board #" to change the order, or to delete an unwanted camera. Correct the tree so you have only the cameras controlled by this appliance, and they are in the correct order.

4. Pull down the File menu and select "Generate Portable Config File". Navigate to the directory D:iNspect\CameraFiles and save your configuration as "GEVCustom". Click "Yes" to overwrite the previous file. The "GEV" prefix is needed to make the file appear in the Camera and Language selector under the GigE camera group.
5. Close the VAGenie Camera Setup utility.
6. Open the Camera and Language Selector utility. Under the GigE camera group, select "Custom".

Editing the Text File

You can edit the configuration file, for the serial numbers of your cameras.

1. If you previously created a custom configuration file, open it in Wordpad. (for example, D:\iNspect\CameraFiles\GEVCustom.txt)
2. Find the serial number of the old camera being replaced.
3. Edit the serial number to match the new camera.

iNspect uses the a file "GEVtest.txt" found in the \iNspect directory. The original of the GEVtest.txt file is in the CameraFiles directory. When you use the Camera and Language Selector utility to select your custom file, a copy is made and renamed GEVtest.txt in the directory D:\iNspect.

The VAGenie Setup Configurator creates a file with much more general camera information, designed for use with frame grabbers and the IFC–SDK Library.